DISSERTATION

ON

ELUCIDATING GREEN FINANCE DYNAMICS IN STARTUP ECOSYSTEMS: A TRAJECTORY TOWARD INDIA'S SUSTAINABLE PARADIGM

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CERTIFICATE

This is to certify that the Dissertation titled "**Elucidating Green Finance Dynamics in Startup Ecosystems: A Trajectory Toward India's Sustainable Paradigm**", has been submitted by Mr. **Arindam Das**, bearing **Enrollment Number: 2321215005013 Registration Number: 230050135948** for partial fulfillments of the Degree of **Master of Laws (LL.M.)** from **Sister Nivedita University** under my guidance. It is his original work and may be placed before the examiners for evaluation.

This research work has not been submitted for the award of any other degree of this University or of any other University.

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DECLARATION BY THE STUDENT

I hereby declare that the work which is being presented in this dissertation entitled *"Elucidating Green Finance Dynamics in Startup Ecosystems: A Trajectory Toward India's Sustainable Paradigm"* in partial fulfilment of the requirements for the award of the degree of Masters of Laws in Corporate Law is an authentic record of my own work carried out during the period from 2023 to 2025 under the supervision of **Mrs. Tashmoyee Mukherjee** Department of Law, Sister Nivedita University.

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PREFACE

In recent years, the discourse around sustainability has transcended environmental advocacy and found resonance in economic and financial frameworks. As India strides towards a more resilient, low-carbon future, the role of green finance has become increasingly pivotal. This research, titled *"Elucidating Green Finance in the Indian Startup Ecosystem: A Trajectory Towards India's Sustainable Paradigm"* is a timely exploration of how green financial instruments, policies, and stakeholder perspectives can catalyze a shift towards environmentally responsible entrepreneurship.

The startup ecosystem in India has emerged as a dynamic driver of innovation, employment, and inclusive growth. However, its integration with sustainable development goals remains nascent. Green finance offers a pathway to bridge this gap—enabling startups to align with global sustainability standards while fostering long-term economic resilience. Despite the growing relevance of this paradigm, there exists a limited understanding of how green finance is perceived, accessed, and implemented across different stakeholder segments within the Indian startup landscape.

This research is motivated by the need to investigate this emerging field through empirical data, stakeholder insights, and policy evaluations. It seeks to uncover the existing awareness, challenges, opportunities, and the transformative potential of green finance as perceived by startup founders, financial investors, institutions, and policy experts. Through structured interviews and comparative analysis, the study attempts to trace the trajectory of India's green finance ecosystem and evaluate its alignment with the broader national sustainability agenda.

I extend my sincere gratitude to all the respondents and stakeholders who contributed their time and perspectives for this research. Their inputs have been invaluable in enriching this academic inquiry with real-world context and depth. It is my hope that this work will serve as a constructive resource for researchers, policymakers, startup founders, and financial institutions who are keen to integrate sustainability with innovation.

This study is not only an academic pursuit but also a reflection of a larger vision—of an India where startups thrive not just economically, but also ecologically.

ACKNOWLEDGMENT

I express my deepest gratitude to **Mrs. Tashmoyee Mukherjee**, Assistant Professor of Law, School of Law, Sister Nivedita University, New Town, Kolkata, whose unwavering support, insightful guidance, and constant encouragement have been instrumental in shaping the course of this research. Despite her numerous responsibilities, she graciously devoted her time and attention to my work, offering invaluable suggestions and fostering my academic growth throughout the research journey.

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I owe a special debt of gratitude to my **family and friends** for their unwavering emotional support, constant inspiration, and steadfast belief in my capabilities. Their encouragement served as a pillar of strength during moments of doubt and difficulty.

Above all, I am eternally thankful to **God**, my source of wisdom and strength, for blessing me with the intellect, motivation, passion, and resilience to pursue and complete this work with dedication and purpose.

Finally, I extend my sincere appreciation to **all those who, in one way or another, contributed to the successful completion of this dissertation**. Your support has been deeply valued and sincerely acknowledged.

Arindam Das.

Place: Kolkata

Arindam Das

Date: 25-04-2025

LIST OF ABBREVIATIONS

Sl. No.	Abbreviation	Full Form
1	CBAM	Carbon Border Adjustment Mechanism
2	COP	Conference of the Parties
3	CSR	Corporate Social Responsibility
4	CXO	C-level Executive (Chief Officer e.g., CEO, CFO, CTO)
5	DEI	Diversity, Equity, and Inclusion
6	DPIIT	Department for Promotion of Industry and Internal Trade
7	EoDB	Ease of Doing Business
8	ESG	Environmental, Social, and Governance
9	ESG ROI	Environmental, Social, and Governance Return on Investment
10	ESG Score	Environmental, Social, and Governance Rating Score
11	ESGF	Environmental, Social, Governance Finance
12	EV	Electric Vehicle
13	FDI	Foreign Direct Investment
14	FPI	Foreign Portfolio Investment
15	G20	Group of Twenty (International Forum)
16	GDP	Gross Domestic Product

17	GFI	Green Finance Initiative
18	GHG	Greenhouse Gas
19	GHG Protocol	Greenhouse Gas Protocol
20	GoI	Government of India
21	IFC	International Finance Corporation
22	IFCI	Industrial Finance Corporation of India
23	IFSCA	International Financial Services Centres Authority
24	IPCC	Intergovernmental Panel on Climate Change
25	IREDA	Indian Renewable Energy Development Agency
26	LL.M	Master of Laws
27	MoEFCC	Ministry of Environment, Forest and Climate Change
28	MoF	Ministry of Finance (India)
29	MSME	Micro, Small and Medium Enterprises
30	NBFC	Non-Banking Financial Company
31	NDC	Nationally Determined Contributions
32	NITI Aayog	National Institution for Transforming India
33	NPSP	National Policy on Skill Development and Entrepreneurship

34	PLI	Production Linked Incentive
35	RBI	Reserve Bank of India
36	RE	Renewable Energy
37	SDG	Sustainable Development Goals
38	SDI	Sustainable Development Index
39	SEBI	Securities and Exchange Board of India
40	SIDBI	Small Industries Development Bank of India
41	SNU	Sister Nivedita University
42	UNEP	United Nations Environment Programme
43	UNFCCC	United Nations Framework Convention on Climate Change
44	VC	Venture Capital

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CHAPTER 1

INTRODUCTION

"The future of finance is green, or there is no future at all." [1]

1.1: Introduction

With the paradigm shift of the globe towards sustainability, green finance acts as a crucial mechanism in channelizing the capital and acting as a catalyst in environmentally responsible enterprises. Financial frameworks must evolve to facilitate investment in startups which have eco-friendly business models. As India focuses towards aligning its financial and environmental goals, instruments such as green bonds, sustainability linked loans and ESG - focused investment strategies have gained prominence.[2] Primarily designed to facilitate the transition towards a low-carbon economy, these instruments mitigate risks and encourage corporate accountability in environmental stewardship.

The green finance sector in India is evolving to support businesses including startups which are committed to sustainable investment due to the urgent need of integrating environmental sustainability into financial decision making. With a dynamic and innovative driven approach, the Indian startup ecosystem holds immense potential in bridging the existing gap of investment and catalyzing the country's transition towards a sustainable economy. Startups are organizations which are positioned in such a way that they can easily implement sustainability into their business models and deploy disruptive technologies, circular business models and scalable solutions to address environmental challenges across sectors such as renewable energy, waste management, green mobility and sustainable agriculture. Since they are in their early operation stage, startups can pivot as required unlike large and traditional enterprises who lack such flexibility.

Although these startups have huge potential in promoting eco-friendly initiatives, systemic barriers in accessing capital especially from mainstream investors who are hesitant to fund early-stage startups with unconventional models lead to tapering off the rise of a green ecosystem. Moreover,

[1] UN Climate Finance Dialogue

[2] **Chengbo Fu, Lei Lu & Mansoor Pirabi,** *Advancing Green Finance: A Review of Sustainable Development*, **1 Des. for Env't & Sust. Dev.** 20 (2023), https://doi.org/10.1007/s44265-023-00020-3 (last visited Jan. 28, 2025).

the existing startup schemes such as Startup India or BIRAC do not sufficiently account for needs of startups which are environmentally sustainable. Since, the longer gestation period, concessional financing and patient capital makes these investments unattractive, investors tend to not risk their financial investments into such startups and to worsen the situation, the current policy incentives do not address such early-stage ventures. A lack of ESG disclosures for unlisted entities, tax incentives and a National Green Venture Capital Funds are critical gaps in the legal and financial ecosystem.

The regulatory landscape in India however presents a complex interplay of policies and institutional frameworks. Although India introduced sustainable development as a legal principle[3] and while regulatory bodies such as the SEBI[4] and the RBI[5] overseas aspects of sustainable finance, a unified and comprehensive legal framework for green finance remains absent. This creates challenges for startups seeking access to sustainable funding, as well as for investors requiring clear guidelines on ESG compliance and financial returns. To bridge this gap, it is essential to assess the effectiveness of existing policies, analyze India's alignment with international green finance standards and explore strategic pathways to strengthen regulatory mechanisms. The motivation behind the study is in the growing realization of the fact that startups and innovation driven enterprises will play a pivotal role in achieving the environmental goals. Since there's no specific law in the country that governs green finance into the startup ecosystem, these entities often face structural and operational issues in accessing green finance.

This study focuses into the evolving landscape of green finance in India, evaluating the role in fostering sustainability-driven entrepreneurship and investment. Through the examination of key regulations, international commitments and global best practices, this study aims to contribute to insights that would enhance India's green finance ecosystem.

1.2: Statement of Problem

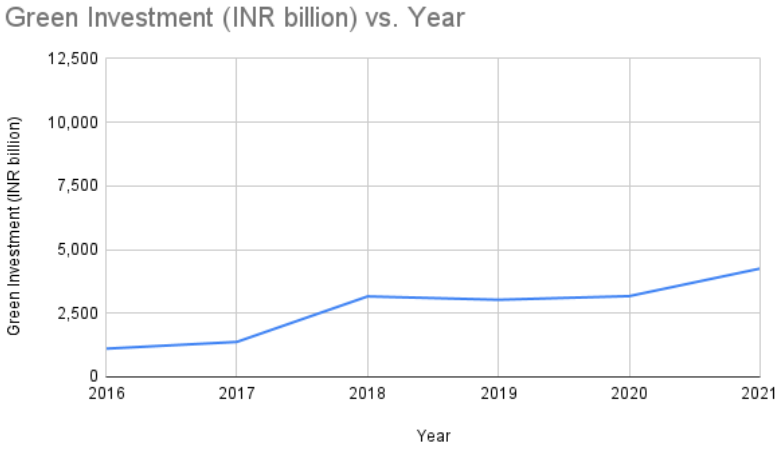
The transition towards a sustainable economy requires green finance mechanisms to support environmentally conscious startups. While India has made significant improvement with respect

[3] **Vellore Citizens' Welfare Forum v. Union of India**, AIR 1996 SC 2715
[4] State Bank of India
[5] Reserve Bank of India

to green finance through instruments such as green bonds, its regulatory landscape remains fragmented and lacks a cohesive framework for fostering sustainability-driven financial practices predominantly within the startup ecosystem. Despite regulatory supervision from institutions like the Securities and Exchange Board of India (SEBI) and the Reserve Bank of India (RBI), there is no comprehensive legal structure akin to the European Union's Green Taxonomy or China's Green Finance Guidelines, leading to inconsistencies in implementation and enforcement.

Year	Green Investment (INR billion)
2016	1,107
2017	1,372
2018	3,160
2019	3,028
2020	3,171
2021	4,253
Required (Annual Avg.)	11,000

Table 1.1 identifies the Tracked green investment and estimated requirements to meet current NDC (INR bn) by India[6].



[6] **Climate Policy Initiative (CPI),** *Landscape of Green Finance in India* (2024), https://www.climatepolicyinitiative.org/publication/landscape-of-green-finance-in-india-2024/.

Fig 1.1: Graphical representation of Table 1.1 showing the significant rise of green finance investments from 2016 to 2021.[7]

Between the year 2016 and 2021 there was a steady rise in green investment in India from INR 1107 billion in 2016 to 4253 billion in 2021. The current level of green finance falls significantly short of the annual report of INR 11,000 billion (USD 170 Billion) which is the average estimated by the Government of India to meet its nationally determined contribution (NDCs) under Paris Agreement. As per the initial investments, a need of 162.5 trillion by 2030 to meet its mitigation commitments. Although there are such huge targets, the green finance data accounts for only 30% of the target.[8] Following an upward revision of its climate commitments in November 2021, a greater urgency to expand the climate related investments to stay in course. Although there has been a substantial increase in funding for both mitigation and adaptation, India is in a risk to fall short of the climate objectives and face harsh consequences of climate change.

One of the vital challenges is the absence of explicit Environmental, Social and Governance (ESG)[9] compliance mandates for startups and small enterprises, which impedes their ability to integrate sustainable business practices. In addition to setting a limit to the access to green capital this regulatory void also creates uncertainty for investors seeking clarity on environmental impact assessments and financial returns. In addition, India's commitments under international treaties such as the Paris Agreement lacks a direct and enforceable linkage with domestic green finance policies, raising concerns about their practical influence on the regulatory developments.

Furthermore, India's green finance framework does not fully align with the international standards, restricting the ability of the country to attract foreign investments in sustainable enterprises. The absence of institutional bodies which are dedicated to incentivize green finance and the lack of a standardized green rating system further complicate investor decision-making. Consequently,

[7] *ibid*

[8] **Rohini Krishnamurthy,** *India Needs to Triple Green Investments for Meeting Climate Targets: Report*, **Down To Earth** (2024), https://www.downtoearth.org.in/climate-change/india-needs-to-triple-green-investments-for-meeting-climate-targets-report (last visited Apr. 13, 2025).

[9] *ESG Compliance Matters for SMEs and MSMEs in India*, **CRIF India Blog**, http://www.crif.in/blog/esg/why-esg-matters-for-smes-and-msmes (last visited Feb. 5, 2025).

startups and emerging businesses struggle to secure green funding, thereby slowing India's progress towards a sustainable financial ecosystem.

The research will aim to address critical gaps, the evolution and effectiveness of existing green finance regulations in the economy, the effect of international climate commitments on domestic policy, and the extent to which green finance frameworks in India integrate global best practices. By showcasing the dynamics, the study aims to provide insights into the ways in which India could strengthen the regulatory and institutional frameworks supporting sustainable entrepreneurship and investments.

1.3: Research Questions

In the specific dissertation, the researcher envisages to answer the following research questions:

1. Whether SEBI, RBI and the current environmental law landscape in India effectively regulate green bonds and other financial instruments in the Indian startup ecosystem?
2. Whether India's climate commitments under the international treaties influence domestic green finance regulations?
3. To what extent does India's green finance regulatory landscape align with foreign legal frameworks, such as those of the EU[10] or China?

1.4: Research Objectives

The study is geared to achieve the following research objectives:

1. To analyze the effectiveness of the regulatory frameworks established by SEBI, RBI, and other relevant Indian authorities in overseeing green bonds and other financial instruments in the Indian startup ecosystem within the current environmental law landscape in India.
2. To examine the impact of India's climate commitments under international treaties on the formulation and implementation of domestic green finance regulations.

[10] European Union

3. To assess the alignment of India's green finance regulatory landscape with international legal frameworks, particularly those of the European Union and China, and identify potential areas for convergence or divergence.

1.5: Hypothesis

Null Hypothesis (H_0):

The existing legal and regulatory frameworks which govern green finance in India do not have a significant impact on the sustainability and growth of startup ecosystem in India and any observed influence is incidental rather than a result of a structured legal mechanism.

Alternate Hypothesis (H_1):

Legal and regulatory frameworks governing green finance in India play an important role in creating sustainable startup ecosystems by providing financial incentives, regulatory clarity, and policy support, thereby bringing about a transition towards a sustainable economic paradigm.

1.6: Research Methodology

This research adopts a mixed methodology where it combines doctrinal legal analysis with an empirical study to comprehensively explore the green finance dynamics in the Indian startup ecosystem and its alignment with practices that promote sustainability. Qualitative approach through both empirical and doctrinal approach will help in bringing a holistic perspective on the regulatory, financial and institutional aspects that hinder or promote the adoption of green finance in India. The qualitative analysis examines regulatory, financial and institutional factors influencing green finance adoption through semi-structured interviews, and through secondary analysis focusing on key stakeholders. It identifies barriers, policy gaps and best practices shaping sustainable finance in India. The quantitative approach involves collection of secondary statistical data collection and empirical evaluation of trends of green finance, investment patterns and ESG-focused startups. Using financial reports and semi-structured interviews it assesses the impact of green financing mechanisms like green bonds, venture capital and government incentives on sustainability-driven businesses.

1.7: Literature Review

(Şanal & Zare, 2017)[11] In their study, *"Sustainable Development through Eco-Entrepreneurship"* explores the connection between eco-entrepreneurship and sustainable development in startups and small and medium-sized enterprises (SMEs) globally, examining how they influence and strengthen each other. The authors conclude that eco-entrepreneurship and sustainable development in SMEs worldwide are interconnected and mutually reinforcing. Without significant and effective advancements in the strategies of small and medium-sized business leaders for poverty alleviation, those in poverty will remain impoverished and the vulnerable will continue to face decline.

(Nuralam & others, 2023)[12] In their article, "*Fostering Sustainable Entrepreneurship in Emerging Markets: An Interdisciplinary Perspective*" discuss how green finance and sustainable entrepreneurship complement each other with green finance which offers essential funding, expertise and a supportive ecosystem to help sustainable entrepreneurs build environmentally sustainable businesses. It is expected that green finance will act as a cornerstone in driving the flow of capital and investment into sustainability initiatives. Effectively utilizing various finance instruments underscores the objective of fostering equity, prosperity and a healthier environment.

(M. Bhatnagar, S. Taneja & E. Özen, 2022)[13] In their paper, on "*A Wave of Green Start-Ups in India—The Study of Green Finance as a Support System for Sustainable Entrepreneurship"* readers will be able to assess how the industrial revolution in India integrates green manufacturing to drive the nation toward sustainable development. Through this study, the authors seek to analyze India's current efforts in promoting sustainable entrepreneurship and provide recommendations for strengthening the ecosystem of green startups and by considering all relevant factors. Additionally, future research may focus on the direct and indirect impact of green finance on environmental challenges.

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[11] **M. Şanal** & **L. Zare**, *Sustainable Development through Eco-Entrepreneurship*, 6 **Int'l J. Bus. & Mgmt. Stud.** 109 (2017).

[12] **I. P. Nuralam** et al., *Fostering Sustainable Entrepreneurship in Emerging Markets: An Interdisciplinary Perspective*, **FSH-PH Publons** (2023), https://doi.org/10.11594/futscipress20m.

[13] **M. Bhatnagar**, **S. Taneja** & **E. Özen**, *A Wave of Green Start-Ups in India—The Study of Green Finance as a Support System for Sustainable Entrepreneurship*, 4 **Green Fin.** 253 (2022), https://doi.org/10.3934/GF.2022012.

(Bergset & Fichter, 2015)[14] Through the paper, "*Green Start-Ups – A New Typology for Sustainable Entrepreneurship and Innovation Research"*, ask why and how different kinds of green startups may run into particular financing possibilities and obstacles when developing their products/services by combining research and theory on innovation and entrepreneurship with sustainable business practices.

(B. Jha & P. Bakhshi, 2019)[15] The study by the authors talks about the various challenges that green financing faces in India and the recommendations to face those challenges. "*Green Finance: Fostering Sustainable Development in India"*, concludes by focusing on the essential use of the unexplored potential of green finance to fund investments or projects that promote environmental sustainability. Blended finance is required in order to lower the total cost of capital for investors in private equity.

(J. Freytag)[16] The author, through this paper on "*An Analysis of the Deficiencies in India's Green Finance Market Reveals Challenges Facing the Country's Green Finance Sector"*, seeks to pinpoint the shortcomings of the green finance sector that impede its expansion and the achievement of environmental objectives. It is driven by current worries over sustainable development in India. It further can be anticipated that this research will also serve as a springboard for deeper investigations into the problems facing India's sustainable financial sector, while accounting for alternative theoretical approaches or research methodologies.

(K. Mohammad Afeef-Al, 2024)[17] Through an Autoregressive Distributed Lag (ARDL) method, Afeef-Al and others assess the connection of green finance, taken as the number of banks who increase the loan activity on ecology projects, and sustainable growth, given by the records of carbon releases.

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[14] **L. Bergset** & **K. Fichter**, *Green Start-Ups – A New Typology for Sustainable Entrepreneurship and Innovation Research*, 3 **J. Innovation Mgmt.** (3) (2015), https://doi.org/10.24840/2183-0606_003.003_0009.

[15] **B. Jha** & **P. Bakhshi**, *Green Finance: Fostering Sustainable Development in India*, 8 **Int'l J. Recent Tech. & Eng'g** 2277 (2019), https://doi.org/10.35940/ijrte.D8172.118419.

[16] **Julia Freytag**, *An Analysis of the Deficiencies in India's Green Finance Market Reveals Challenges Facing the Country's Green Finance Sector* 1–95 (2020) (unpublished M.A. thesis, Digitala Vetenskapliga Arkivet), https://www.diva-portal.org/.

[17] **K. Mohammad Afeef-Al** et al., *Green Finance and Its Impact on Achieving Sustainable Development*, 12 Uncertain Supply Chain Mgmt. 1525 (2024), https://doi.org/10.5267/j.uscm.2024.3.026.

(Sami & Roychowdhury, 2022)[18] In their research, "*A Study on the Impact of Sustainable Entrepreneurship on Subjective Success of Ecopreneurs"* focuses on the various aspects of sustainable business related to one another for both genders. The paper demonstrates that women ecopreneurs can lessen adverse effects on the environment regardless of the quantity of their investments. According to this study, companies that engage in sustainable entrepreneurship have not only produced financial gains but also had positive effects on the environment and society.

The study focuses on the need for lower-income, environmentally conscious nations to implement green innovations and environmental technology in their production processes in order to create a green entrepreneurship ecosystem.

(Sharma & Choubey, 2022)[19] The study is qualitative in nature and consists of 36 middle-to senior-level managers from twelve public and private Indian banks who participated in semi structured in-depth interviews. This paper focuses on how green banking practices can improvise the green image of a company and help rebuild consumer trust.

(Rajesh & Mohan, 2019)[20] in their study of Green *Entrepreneurship*, focuses on the concept of green entrepreneurship and to examine the new trends of greening the environment. Green entrepreneurship greatly benefits from the involvement of regional development agencies and incubators. Although a number of factors which are sufficiently developed and have reached the required levels of regulations prevented green entrepreneurship from being implemented to the intended degree in the nation.

(S. Srivastava & M. Gulati, 2023)[21] This paper finds green entrepreneurship as a tool for sustainable development in India. The research offers comprehensive information regarding the

[18] **Sania Sami** & **Soma Roychowdhury**, *A Study on Impact of Sustainable Entrepreneurship on Subjective Success of Ecopreneurs*, 8th Pan IIM World Mgmt. Conf., IIM Kozhikode (2021), https://doi.org/10.1007/s10668-021-01426-9.
[19] ibid.
[20] **D. A. Rajesh** & **M. R. Mohan**, *Green Entrepreneurship*, 22 **Think India J.** Article 10, 4145 (Nov. 2019), https://thinkindiaquarterly.org/index.php/think-india/article/view/11384.
[21] **Srivastava** & **Monika Gulati**, *Green Entrepreneurship in India: A Tool for Sustainable Development*, 6 **Shodh Samagam** 816, 816–22 (2023), https://shodhsamagam.com/uploads/issues_tbl/1687419579reen-Entrepreneurship-in-India-A-Tool-for-Sustainable-Development.pdf

support systems accessible to small and expanding businesses was examined in this paper titled "Green *Entrepreneurship in India: A Tool for Sustainable Development"*.

(M. Vyas, 2017)[22] In addition to the other papers, this paper on "*Green Finance and Sustainable Development: An Indian Perspective"* covers topics of sustainable development and green finance. The report also focuses on the range of green financial services and products that financial institutions provide as well as the potential for future initiatives in this area in India.

(M. Kharade, 2021)[23] With the help of secondary data, this paper titled "*Green Finance for Sustainable Development—Study on the Indian Context"* examines government initiatives, constraints and the demand for green finance. This study aims to raise awareness among private investors with respect to their involvement in sustainable initiatives across the globe. India ought to concentrate on both foreign and domestic investment. It is therefore important to create green finance solutions that appeal to both domestic and foreign investors.

(C. Jin et al., 2023)[24] With the use of empirical research in the manuscript "*Green Finance, Renewable Energy and Carbon Neutrality in OECD Countries"*, this study examines how green finance and renewable energy sources affect the carbon neutrality targets of 38 OECD member nations between 2013 and 2021. The purpose of this research is to investigate how the adoption of renewable energy sources and green finance affect the carbon neutrality of OECD member nations.

(G. Charles & B. Philip, 2020)[25] The focus of the research, "*Green Finance: Recent Drifts, Confrontation and Prospect Opportunities for Sustainable Development in India"* is on the latest developments, prospects and difficulties and different investment routes related to green finance in India. They also want to analyze the trajectory of green finance and determine the extent to which the programmes of the Indian government have succeeded in achieving its goals so far.

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[22] **Dr. Manmohan Vyas**, *Green Finance and Sustainable Development: An Indian Perspective*, 4 **Int'l J. Multifaceted & Multilingual Stud**. (2017), https://www.academia.edu/41347098/Green_Finance_and_Sustainable_Development_An_Indian_Perspective

[23] **Dr. Mahadev Kharade**, *Green Finance for Sustainable Development—Study on the Indian Context*, 18(10) **PalArch's J. Archaeol. Egypt/Egyptology** 2459 (2021).

[24] **Cheng Jin** et al., *Green Finance, Renewable Energy and Carbon Neutrality in OECD Countries*, 211 **Renewable Energy** 279 (2023), https://doi.org/10.1016/j.renene.2023.04.105

[25] **Charles G**. & **Philip B**., *Green Finance: Recent Drifts, Confrontation and Prospect Opportunities for Sustainable Development in India*, 9(4) **MuktShabd J.** 1854 (2020).

(S. Nenavath & S. Mishra, 2023)[26] This paper has analytically examined the impact of financial technology and green finance on sustainable economic growth. The paper on "*Impact of Green Finance and Fintech on Sustainable Economic Growth: Empirical Evidence from India"*, further focuses on the influence of green finance on financial efficacy, structure and environmental quality, protection & development all contributing to a high quality economic growth. These findings analytically support the positive effects of green finance.

(M. Kadaba et.al., 2022)[27] The author focuses on the determination of the efficacy of climate financing or sustainable finance which is necessary for MSMEs and companies to have greener production infrastructure and government of India missions on climate change. Each ESG fund is a lucrative opportunity for both investors and corporations and it has a positive impact on the environment and economic growth.

(C. Chan & K. Bharur, 2023)[28] The purpose of this research is to understand the influence of green funding on carbon emissions in India with a special emphasis on energy efficiency. Optimizing consumption by increasing energy utilization efficiency and improving energy consumption structure is an excellent way to maximize the carbon emission reduction effect of green finance.

(Stojanović, D., 2020)[29] The study, "*Sustainable Economic Development Through Green Innovative Banking and Financing"* focuses on the contribution of banks to long term economic development through green banking initiatives. The author puts an emphasis on the transformation of banks around the world which is becoming a vital aspect of modern strategy for attracting new consumers and stimulating long-term economic and financial growth.

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[26] **Nenavath**, **Sreenu** et al., *Impact of Green Finance and Fintech on Sustainable Economic Growth: Empirical Evidence from India*, 9(5) **Heliyon** e16301 (2023), https://doi.org/10.1016/j.heliyon.2023.e16301.

[27] **Kadaba**, **Dr. Mahesh K.M.**, **Aithal, P. S.**, & **Sharma, K. R. S.**, *Impact of Sustainable Finance on MSMEs and Other Companies to Promote Green Growth and Sustainable Development*, 6(1) **Int'l J. Applied Eng'g & Mgmt. Lett.** 60 (2022), https://doi.org/10.2139/ssrn.4038990.

[28] **Chan** & **K. Bharur**, *Optimizing Energy Consumption: Assessing the Influence of Green Finance on Carbon Emissions in India*, **Int'l J. Novel Rsch. Eng'g & Pharm. Sci.** (2023), https://www.researchgate.net/publication/372724100_Optimizing_Energy_Consumption_Assessing_the_Influence_of_Green_Finance_on_Carbon_Emissions_in_India.

[29] **Stojanović, D.**, Sustainable Economic Development Through Green Innovative Banking and Financing, 4 **Econ. Sustainable Dev.** 35 (2020), https://doi.org/10.5937/ESD2001035S.

(Brahmi, M. et.al., 2023)[30] The paper "*The Role of Greener Innovations in Promoting Financial Inclusion to Achieve Carbon Neutrality: An Integrative Review"* analyzes green innovation strategies and innovative financial solutions that effectively addresses environmental challenges. The review highlights the significant potential of the green financial instruments in promoting carbon neutrality through supporting climate change mitigation, reducing carbon emission and advancing Sustainable Development Goals (SDGs).

(K. Y. Chau, et.al., 2023)[31] in his article, "*The Role of Natural Resources and Eco-Financing in Producing Renewable Energy and Carbon Neutrality: Evidence from Ten Asian Countries"* examines how natural resources and eco-financing influence renewable energy (RE) production and carbon neutrality across 10 Asian nations. Through the CS-ARDL technique, their finding indicates that natural resources, eco-financing, economic growth and industrialization play a crucial role in boosting RE output and achieving the neutrality of carbon targets of the COP26 resolution. This paper also highlights the increased availability and sustainable utilization of natural resources to enhance renewable energy production, while replacing carbon-intensive materials with natural resources accelerates progress toward CO_2 neutrality.

(Wasan P. et. al., 2021)[32] This Article finds that policy, financial conditions and knowledge are the top three primary barriers in the adoption of green finance which results in uncertainty and fragmented financial flows. The need for an integrated strategy such as the establishment of coherent green policies, credit enhancement mechanisms and the development of a low-cost financial infrastructure which is tailored to green investments. A combination of direct and incentivized finance through leveraging both public and private capitals and aligning financial markets with technological advancements is what the author suggests to combat the issues related to green finance.

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[30] **Brahmi, M., Esposito, L., Parziale, A., Dhayal, K. S., Agrawal, S., Giri, A. K., & Loan, N. T**., *The Role of Greener Innovations in Promoting Financial Inclusion to Achieve Carbon Neutrality: An Integrative Review*, 11 **Economies** 194 (2023), https://doi.org/10.3390/economies110701

[31] **Chau, Ka Yin, Sadiq, Muhammad** & **Chien, FengSheng**, *The Role of Natural Resources and Eco-Financing in Producing Renewable Energy and Carbon Neutrality: Evidence from Ten Asian Countries*, 85 **Res. Pol'y** (2023), https://doi.org/10.1016/j.resourpol.2023.103846.

[32] **P. Wasan, A. Kumar** & **S. Luthra**, Green Finance Barriers and Solution Strategies for Emerging Economies: The Case of India, 71 **IEEE Transactions on Eng'g Mgmt. 414 (2021)**, https://doi.org/10.1109/TEM.2021.3123185.

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(Soundarrajan et. al., 2016)[33] The study focuses on the recent trends on green investments and its alignment with the market valuation, promotion of human well-being and enhancement of social equity. It also identifies challenges and opportunities which are unique to emerging economies like India which includes policy standardization, financial literacy and infrastructural gaps.

(Ravichandran & Roy, 2022)[34] The paper deals with green finance as a critical mechanism for achieving climate - related goals with specific lens on the policy evolution, investment strategies and global commitment that India has committed to. It advocates for an increased adoption and integration of green finance ensuring long-term ecological and economic sustainability

(Sarangi, 2018)[35] Through a granular analysis of the challenges involved in mobilizing green finance in India the study focuses on financing renewable energy. Through an analysis of emerging pathways and sectoral analysis of the hurdles in channeling funds towards a more sustainable energy transition, it highlights the impediments such as short tenure of loans, high capital costs, and insufficient availability of long-term debt financing, which act as a constraint in cases of clean energy investments.

(Ermakova & Petrovna)[36] The author centers the paper on a comparative legal analysis of green finance regulation in the European Union, the People's Republic of China and the Russian Federation. Through existing legal frameworks and regulatory mechanisms governing green finance, the paper finds that neither China nor EU has yet established a harmonized or comprehensive regulatory mechanism for green finance.

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[33] **Parvadavardini Soundarrajan** & **Nagarajan Vivek**, *Green Finance for Sustainable Green Economic Growth in India*, 62 **Agric. Econ. – Czech** 35 (2016), http://agricecon.agriculturejournals.cz/doi/10.17221/174/2014-AGRICECON.html

[34] **Shankar Ravichandran**, **Mandira Roy** et al., *Green Finance: A Key to Fight with Climate Change*, 2 **Indian J. Econ. & Fin. (IJEF)** 34 (2022), https://doi.org/10.54105/ijef.B2526.112222.

[35] **G.K. Sarangi**, *Green Energy Finance in India: Challenges and Solutions*, Asian Dev. Bank Inst. (ADBI), Working Paper No. 863 (2018), https://www.econstor.eu/bitstream/10419/190284/1/adbi-wp863.pdf.

[36] **Elena P. Ermakova** & **Yermakova Yelena Petrovna**, *The Development of the Legal Framework for "Green" Finance in Russia, the EU and China: A Comparative Legal Analysis*, 24 RUDN J.L. 335 (2020), https://doi.org/10.22363/2313-2337-2020-24-2-335-352

(Larsen, 2022)[37] The paper investigates the global dynamics of green financial policy development by conducting a comparative analysis of China and the European Union (EU) , two of the most influential actors in the global green finance landscape. Despite the increasing adoption of green financial policies worldwide, the policy dynamics and models remain insufficiently understood. The literature overviews the novel insights into how China and EU shape global policy norms through different types of approach: China as top-down policy pioneer and the EU as a bottom-up standard setter.

(Geissdoerfer, 2018)[38] The paper examines the critical role of sustainable business model innovation (SBMI) as a tool for having a sustainable competitive advantage and improved sustainability performance. Despite its growing relevance, many SBMI efforts face a high failure rate in existing scholarship. The findings of this paper include a clarity of the foundational terms and their interrelations and the identification of critical gaps in the current SBMI discourse.

(Nedopil et. al., 2021)[39] The paper focuses on the evolution, differentiation and harmonization of green finance standards across various economic systems. The study highlights the limited understanding exists regarding the nature of these standards and the factors contributing to their divergence rather than convergence. The author validated three emerging models of green finance standards - output-based, input-based and process-based standards which progress the dynamic nature of their evolution.

1.8: Research Gap

India's legal and regulatory framework for green finance remains underdeveloped, particularly concerning startups and SMEs, which face no explicit ESG compliance mandates. As a result of which, a substantial lacuna is created with respect to enforcing the sustainable business practices. This regulatory void not only impedes the integration of environmental, social and governance framework within emerging enterprises but also tends to create a fragmented compliance

[37] **Mathias Lund Larsen**, *Driving Global Convergence in Green Financial Policies: China as Policy Pioneer and the EU as Standard Setter*, 13 **Glob. Pol'y** 358 (2022), https://doi.org/10.1111/1758-5899.13105.
[38] **Martin Geissdoerfer, Doroteya Vladimirova** & **Steve Evans**, *Sustainable Business Model Innovation: A Review*, 198 J. Cleaner Prod. 401 (2018), https://linkinghub.elsevier.com/retrieve/pii/S0959652618318961.
[39] **Christoph Nedopil**, **Talia Dordi** & **Olaf Weber**, *The Nature of Global Green Finance Standards—Evolution, Differences, and Three Models*, 13 Sustainability 3723 (2021), https://doi.org/10.3390/su13073723.

ecosystem which lacks uniformity. In addition to the regulatory void, the absence of a codified green finance legal framework, analogous to the European Union's Green Taxonomy[40] or China's Green Finance Guidelines, further increases the regulatory inconsistencies which results in an incoherent and disjointed oversight mechanism. The lack of a harmonized legislative infrastructure for green finance in India not only restricts the flow of sustainable capital but also undermines the country's alignment with global best practices in climate finance and sustainable investments.

Moreover, the weak institutional capacity has further compounded the issue as key regulatory bodies like SEBI and RBI have yet to establish strong, targeted initiatives to promote green finance. The absence of dedicated units to incentivize these bodies have left a void in supporting green finance initiatives. Furthermore, the absence of green rating systems in India prevents investors from accurately assessing the environmental sustainability of investments or loans and therefore hinders informed decision-making and the growth of the green finance sector. The gap in legal clarity and institutional capacity constrains the potential for startups to embrace sustainable finance solutions, thereby limiting the flow of capital into environmentally-conscious ventures and undermining the country's commitment to global best practices in climate finance and sustainable investments.

1.9: Scope & Framework of the Study

The study focuses on exploring the dynamics of green finance and the regulatory landscape in India with a special emphasis on the role of startups in adopting sustainable finance solutions. The prime objective of this research is to examine the gaps and the opportunities in the Indian regulatory framework that hinder or enable the flow of capital into environmentally-conscious ventures particularly in the light of global commitments to climate change mitigation and sustainable development.

Key areas covered in this study will include:

1. **Regulatory Gaps in Green Finance:** This study will evaluate the lack of dedicated green finance regulatory bodies in India such as units within SEBI (Securities and Exchange

[40] **European Commission**, *EU Taxonomy for Sustainable Activities*, https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en.

Board of India) and RBI (Reserve Bank of India), and their implications for promoting green financial instruments like green bonds. Complementing this assessment will be a study of the absence of formal green rating systems and how this retards investor confidence and development of sustainable finance markets in India.

2. **Impact of International Treaties on Domestic Regulations:** The study will analyze how India's climate commitments under international agreements influence the domestic green finance policies in India. This will include an exploration of how these global commitments are integrated into Indian legal frameworks and their effect on the regulations of green bonds, sustainable investments and related financial products.

3. **Comparative Analysis with International frameworks:** The study will bring up a comparative analysis of India's green finance regulatory landscape with those of established frameworks such as the EU Green taxonomy and China's green finance guidelines. The focus of the paper is to determine the extent to which India aligns with these international standards and identify the barriers which prevent it from adopting similar, well defined regulatory measures for sustainable finance.

4. **Institutional and Legal Constraints:** The research will assess institutional capability and clarity of legal challenges with regards to India's green finance landscape. This includes examining the strength of institutional support, lack of green finance incentives, and fragmented compliance mechanisms that hinder the development of an integrated green finance ecosystem especially for startups and SMEs which could benefit from increased access to green capital.

5. **Focus on the Indian Startup Ecosystem:** A significant portion of the study will be dedicated to understanding the specific challenges and opportunities faced by startups in accessing green finance. This research will investigate how the current regulatory gaps limit their ability to integrate Environmental, Social and Governance (ESG) frameworks and adopt sustainable business practices. It will also explore potential legal reforms to enhance the flow of capitals to these ventures.

6. **Policy Recommendations and Future Outlook:** In reference to the findings in the study, the study will propose policy recommendations which focus on strengthening green finance

in India mainly for startups and SMEs. This would include propositions for the establishment of institutions for green finance, creation of green rating systems, and reforms to align India's regulatory framework to global best practices in sustainable finance.

The focus of the research will empower a theoretical analysis of challenges and opportunities in the Indian green finance ecosystem for giving suggestions toward improving the legal, institutional, and regulatory environment and to enable them to engage more actively so as to support economic growth in a sustainable manner.

1.10: Limitations of the Study

While the study '*Elucidating Green Finance Dynamics in Startup Ecosystems: A Trajectory towards India's Sustainable Paradigm*' brings valuable insights into trends and the challenges of green finance in the Indian startup ecosystem, there are certain limitations that constrains the depth and generalization of the findings of the study.

Contextual and Sectoral Limitations

Due to the ever-evolving landscape of green finance, there are frequent updates to regulatory frameworks, financial instruments and policies related to climate. This research may become less relevant over time. Significant shifts of both the evolving and dynamic startup ecosystem and sustainability financing would have policy shifts, budgetary allocations and international climate negotiations (such as COP[41] summits) which would significantly alter green finance trajectory both with respect to availability and accessibility across the country.

In addition to this, the study does not differentiate geographical and economic landscape. Green startups in Tier-I cities of India (metropolitan hubs) such as Delhi, Mumbai, Bengaluru and Kolkata provide better access to institutional finance, awareness and networks, which startups in Tier II & III cities do not receive. Hence, the study may inadvertently exclude location-specific challenges and opportunities which are critical to understanding the broader picture. Moreover, since the paper does not focus on a sectoral analysis of green financing which includes domains

[41] Conference of the Parties at the United Nations Framework Convention on Climate Change.

like clean energy, sustainable agriculture, waste management, green mobility and eco-friendly technology, a one-size fits all approach may not deal with the strategic value of policy recommendation and may lead to an over simplified conclusion.

Limitation of the Empirical Approach

The empirical component of the study is based on qualitative inputs from a selected group of 20 individuals which includes startup founders, sustainability professionals and policy influencers. While there are perspectives from various stakeholders there is a limited sample size and has a restricted representativeness of the findings. Since the study relies on qualitative analysis, this study limits the ability to track trends, correlations or economic impacts of green finance interventions.

The study offers an exploratory understanding of green finance challenges and pathways; it is more of a foundational effort which calls for more comprehensive data-driven research in the future. Although the study serves as an important starting point in focusing on the gap, potential and regulatory sandboxes within the Indian startup ecosystem. Future studies can focus on expanding sample size and incorporating regional data and cross-sector with a mixed method approach for deeper and more actionable insights.

CHAPTER 2

CONCEPTUAL FRAMEWORKS AND THEORETICAL UNDERPINNINGS

"When the last tree is cut, the last fish is caught, the last river is polluted and when, to breathe the air is sickening, you will realize, too late, that wealth is not in bank accounts and that you can't eat money." [42]

2.1: Defining Green Finance and Its Role in Sustainable Development

2.1.1: Introduction

Sustainable development can be interpreted in a multi-dimensional way but its prime aim is to maintain a balance between diverse and often competing needs while recognizing the social, environmental, ecological, and economic constraints that the society faces.[43] The needs of humans are often driven by growth and competition leading to development without fully considering long-term consequences. This unsustainable trajectory has led to major challenges, including economic and financial crisis which has its roots from banking practices; and climate change which gets its cause from the excessive reliance on fossil fuels. If such development continues unchecked, its negative impacts will become more severe, which would further necessitate immediate corrective action.

Green startups are one of the solutions to this unsustainable approach where service providers and manufacturers focus on implementing energy efficient technologies which reduce waste and models which emphasize on operations which have a lower carbon footprint, and prioritize circular economies and eco-friendly innovations. In addition to contributing to environmental sustainability, these startups also create new market opportunities in sectors like renewable energy, waste management and green technologies. As opportunistic the concept sounds, achieving the Sustainable Development Goals is not an easy task. The prime challenge is the significant capital investment that would be required to implement green technology or promote green startups.

[42] **Alanis Obomsawin**, American-Canadian filmmaker
[43] *Supra, 21*

According to UNCTAD[44] between $1,179 and $1,383 per person each year would be required to achieve the SDGs[45]. The government and public sector institutions often face financial constraints, budgetary restrictions, and competing priorities which restrict them from meeting the huge funding requirements of sustainable development goals which requires trillions of dollars annually far beyond what a public institution can provide. This funding gap has led to the emergence of green finance, which leverages private investments, sustainable bonds and other financial instruments to bridge the shortfall and drive eco-friendly economic growth with respect to meeting the financial demands.

2.1.2: Green Finance

Green finance is used generally as an umbrella term and has no specific definition mentioned in any statute. The **United Nations Environment Program** is of the view that green finance includes various financial instruments, services and investment strategies with a primary focus on supporting environmentally sustainable initiatives and addressing climate change-related challenges. The aim is to direct the financial resource towards activities which bring positive outcomes while facilitating the transition to a low-carbon economy. Also known as sustainable or environmental finance, it is an intermix of financial activities and technological advancements to promote environmental preservation while aligning with broader financial sector objectives.[46]

Niklas Höhne defined Green finance as Green finance includes financial investments in sustainable development, environmental policies and goods which focus on a more sustainable economy. It emphasizes climate finance as a key component but includes other concerns such as biodiversity conservation and reduction in pollution. The definition specifically distinguishes between adaptation of financial flows (reducing the impact of climate change) and mitigate financial flows which reduces greenhouse gas emissions.[47]

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[44] United Nations Conference on Trade and Development.

[45] The Costs of Achieving the SDGs: About, UN Trade & Development (UNCTAD), https://unctad.org/sdg-costing/about

[46] **Inggang Perwangsa Nuralam** et al., *Fostering Sustainable Entrepreneurship in Emerging Market: An Interdisciplinary Perspective* (2023), https://book.futuresciencepress.com/index.php/FSPB/catalog/book/20

[47] **Niklas Höhne** et al., *Mapping of Green Finance Delivered by IDFC Members*, Project No. CLIDE12246, ECOFYS Ger. GmbH (2012), https://www.idfc.org/wp-content/uploads/2019/03/idfc_green_finance_mapping_report_2012_06-14-12.pdf

A report by PwC viewed that green finance focuses on the lending processes of banks and financial risks associated with incorporating environmental factors. This underscores the role of banks in facilitating eco-friendly investment, which focuses on low-carbon industries and ensures that the environmental risks are integrated into financial decision making.[48] Green finance is depicted as a pivotal financial framework designed to combat climate change and facilitate the transition to an economy that is sustainable and a low-carbon footprint. It covers a broad spectrum of financial activities, including policy development, insurance mechanisms and green bonds all focusing on either reducing environmental harm or actively promoting sustainability.[49]

2.1.3: Historical Evolution of Green Finance

Green finance derives its roots from the environmental movement which gained traction in the 1970s. This period was a witness of the surge in the awareness of environmental issues such as the first Earth Day in 1970 and also with the establishment of bodies such as the U.S. Environmental Protection Agency. In academic circles the concept of sustainable development emerged in 1972 which was the linkage of social, economic and environmental issues. The idea of sustainable development was further refined and was popularized by the Brundtland Report headed by Gro Harlem Brundtland, by the World Commission on Environment and Development formally titled "Our Common Future" which focused on the alignment of economic development with environmental sustainability. [50]

By the 1980s and 1990s financial markets were seen as instruments which promoted sustainability. Green Bonds were one of the earliest applications of the concept of green finance which focused primarily on allocating funds for projects which are environmentally beneficial[51]

The 2000s witnessed a rapid expansion and institutionalization of green finance mechanisms. The Kyoto Protocol which became effective in 2005 introduced initiatives such as the Clean

[48] **P.W.C.,** *Exploring Green Finance Incentives in China:* ***Final Report*** **(2013).**
[49] **Rui Cai & Jianluan Guo,** *Finance for the Environment: A Scientometrics Analysis of Green Finance*, 9 **Mathematics** 1537 (2021), https://www.mdpi.com/2227-7390/9/13/1537.
[50] **Duy Anh Le, Thu Ha Truong & Trung Chinh Dang,** 1.1. *History of the Green Finance Concept* (2024), https://pressbooks.pub/greenfinancetoolseducationinvietnam/chapter/chapter-1-2/
[51]**Flaherty, M., Gevorkyan, A., Radpour, S., & Semmler, W.,** Financing Climate Policies Through Climate Bonds–A Three-Stage Model and Empirics, 42 *Research in International Business and Finance* 468, 468-79 (2017).

Development Mechanism (CDM) which facilitate carbon credit trading. The European Investment Bank was the first investment bank which officially issued Green Bonds as a part of Green Finance in the year 2007. These incentives encouraged investment in eco-friendly projects predominantly in developing nations. The US Recognized CO_2[52] as a pollutant under the Clean Air Act — foundational for climate-linked financial regulations.[53]

Over the last decade, green finance as a concept has evolved from an unorthodox concept to a mainstream financial strategy driven by global climate commitments. The 2015 Paris Agreement played a vital role in setting ambitious targets for reducing GHG emissions and mobilizing financial flows towards a development which is climate friendly. In accordance with this change, there was an unprecedented rise in the issuance of green bonds that financial markets were a witness to. The world bank, the European investment bank and private corporations began issuing green bonds to fund projects that had a negative impact on carbon emissions. In addition to green bonds, sustainability-linked loans (SLLs) emerged as a key innovation which have been discussed in detail in chapter 2.2.

The role of carbon markets expanded significantly across the globe with the EU Emission Trading System (ETS) and China's national carbon market which introduced mechanisms for pricing carbon emissions which encouraged businesses to transition to low-carbon operations. Additionally, companies were pushed by stricter ESG[54] reporting standards by government and regulatory authorities which compelled companies to disclose climate risks and integrate sustainability into their financial strategies. Central banks, including the Bank of England and the European Central Bank introduced climate stress tests to measure financial sector vulnerabilities to climate-related risks. These efforts not only mainstreamed green finance but also paved the way for its further evolution in today's startup-driven economy.

With the paradigm shift towards innovation-driven solutions and startups playing a crucial role in the transformation. As the government and large corporations seek decentralized and scalable

[52] Carbon Dioxide
[53] **Massachusetts v. EPA**, 549 U.S. 497 (2007), US Supreme Court
[54] Environmental, Social and Governance

sustainability models, startups in climate tech, renewable energy, circular economy and green fintech are leading the change.

The rise of venture capital and private equity funding for sustainability-focused startups is one of the biggest trends in green finance today. Investors are increasingly backing startups which offer low-carbon technologies, smart energy solutions and supply chains which are sustainable in nature. Another critical development is the integration of AI and blockchain in the system of green finance. Startups are leveraging blockchain for carbon credit verification and AI-driven analytics for climate risk assessments which make sustainable finance more transparent and efficient. In addition to this, green fintech startups are bringing in ESG-focused investment platforms which is enabling retail and institutional investors to track and invest in sustainable projects with real-time data. Crowdfunding and peer-to-peer lending for sustainability projects have gained huge prominence which has reduced the reliance on traditional banks.

Regulatory bodies are tailoring green finance policies to support startups which helps them in driving rapid innovations. The EU Green Deal[55] India's Sustainable Finance Roadmap and the UAE's Net Zero 2050 strategy[56] are focusing on introducing funding programs and tax incentives. With the intensification of climate challenges across the globe, startups are bridging gaps between finance and sustainability by focusing on disruptive solutions from bio-based materials to carbon-negative technologies.

2.1.4: Green Finance and Conventional Finance Mechanism

Green finance and Conventional finance differ fundamentally in their approach to investment, risk management and regulatory framework. Although the focus of both these mechanisms boil down to achieving financial returns, green finance focuses on sustainability considerations which ensure that the investments contribute to environmental and social well-being.

1. Investment Principles: Sustainability vs. Profit Maximization

[55] **Council of the European Union**, *What Is the European Green Deal?*, **Consilium** (last visited Apr. 20, 2025), https://www.consilium.europa.eu/en/policies/european-green-deal/.
[56] The United Arab Emirates, *The UAE's Net Zero 2050 Strategy*, The Official Portal of the UAE Government, https://u.ae/en/about-the-uae/strategies-initiatives-and-awards/strategies-plans-and-visions/environment-and-energy/the-uae-net-zero-2050-strategy.

Resources of green finance are guided by sustainability principles and are predominantly directed towards projects which promote conservation of the environment through production of renewable energy, sustainable agriculture and eco-friendly infrastructure. The investments undergo rigorous Environmental Impact Assessments (EIA) to understand the effect of the organization and the business on climate change, pollution reduction and biodiversity conservation. Furthermore. Environmental, Social and Governance factors are focused to ensure long-term environmental and economic benefits. Late in the year 2017, For the first time in South Africa, a court mandated a climate impact assessment as a prerequisite for environmental authorization.[57]

Conventional finance on the other hand focuses on short-term profit maximization and increasing shareholder value. Financial returns, market demands and economic indicators are the factors which conventional finance mechanisms focused on. With no mandatory sustainability assessment unless specifically required by external regulators.

2. Risk Management: Environmental Risks vs. Market Risks

In green finance, predominant risk on the environment such as climate change, resource depletion and regulatory compliance are taken into account when risk assessment occurs. Climate risk modeling which predicts the impact of climate-related risks such as extreme weather events or rising sea levels on their investments are models that financial institutions employ.[58] Furthermore, green insurance products, like climate risk insurance, help mitigate financial losses caused by environmental hazards. Green portfolio diversification ensures that investments are spread across sustainable industries which reduces exposures to specific environmental risks.

Conventional finance focuses on economic downturn, inflation, interest rate fluctuations and geopolitical institutions assess risks related to business performance, they do not always consider environmental factors unless the regulations mandate.[59] The lack of climate risk assessment can

[57] **Earthlife Africa Johannesburg v. Minister of Environmental Affairs and Others**, Case No. 65662/16, [2017] ZAGPPHC 58 (High Ct. S. Afr. Feb. 8, 2017).
[58] Global Environment Facility, *Introduction to Green Finance*, https://www.thegef.org/sites/default/files/events/Introduction%20to%20Green%20Finance.pdf
[59] Economics Observatory, *How Are Geopolitical Risks Affecting the World Economy?*, https://www.economicsobservatory.com/how-are-geopolitical-risks-affecting-the-world-economy

lead to financial vulnerabilities primarily for businesses operating in environmentally sensitive sectors.

3. Regulatory and Policy Frameworks: Sustainability Standards vs. Profit-Oriented Regulations

Paris Agreement (2015) and other international frameworks encourage financial institutions to invest into companies which align their interest with climate goals, while the EU Green Taxonomy and SEBI's green bond guidelines define criteria for environmentally sustainable investments. In addition to the disclosure standards like the Task Force on Climate-related Financial Disclosures (TCFD) which mandates financial institutions to report climate-related risks ensuring transparency and accountability. Disclosure and investor protection — later extended to ESG norms (BRSR[60])[61].

General financial regulations which prioritize economic stability and investor protection are what conventional finance is regulated by. Frameworks such as banking laws and corporate governance codes, focus on financial risk management, prevention of fraud and capital adequacy requirement rather than sustainability. Corporate governance failure to address climate risks under ESG standards.[62]

4. Financial Instruments: Green Bonds vs. Traditional Securities

The financial instruments which come under the domain of green finance are specially designed to fund sustainable projects. Green bonds are among the most popular instruments which allow the government and corporations to raise capital for eco-friendly initiatives such as renewable energy, climate resilient projects and sustainable infrastructure. Carbon pricing and emission trading systems (ETS) which incentivize businesses to reduce carbon footprints by placing a financial cost on pollution.[63]

On the other hand, financial instruments such as stocks, bonds, derivatives and traditional loans dominate the conventional financial market. These instruments focus on capital growth, corporate

[60] Business Responsibility and Sustainability Report
[61] **SEBI v. Sahara (2012)**, 10 SCC 603
[62] **ClientEarth v. Shell plc & Ors.,** [2023] EWHC 1137 (Ch) (Eng.)
[63] Dishari Chatterjee, *7 Popular Green Financing Instruments You Need to Know About*, Neufin (May 3, 2023), https://neufin.co/blog/green-financing-instruments/.

expansion and short-term profitability rather than sustainability. There has been no specific model or mechanism to support green projects in the conventional financial mechanisms.

5. Accountability and Transparency: Mandatory Disclosures vs. Voluntary Reporting

Green finance prioritizes transparency and accountability which requires the investors and the institutions to disclose the risk associated with the product or service in association with the environment and the sustainability impacts. Policies such as the United Nations Principle for Responsible Investment (PRI) and ESG disclosure standards ensure that businesses provide accurate information about their environmental footprints, helping stakeholders make informed decisions.[64] On the other hand there are minimal sustainability disclosures and maximum focus on profit maximization. Companies tend to voluntarily report sustainability initiatives but there are no universal requirements mandating such transparency.

6. Long-Term vs. Short-Term Financial Goals

Green finance is primarily a long-term investment focusing on the need to balance economic growth with environmental sustainability. It primarily seeks to finance organizations which contribute to climate resilience, energy efficiency and ecosystem conservation which ensures economic stability in the face of environmental challenges. Conventional finance are generally short-term and consists of immediate financial return over long-term sustainability. Quarterly earnings, stock performance and rapid growth even at the expense of environmental degradation is what conventional finance focuses on.

2.2: Green Finance Instruments and Their Application in Startup Ecosystems

2.2.1: Overview of Green Finance Instruments

As various scholars suggest, green finance includes various kinds of instruments which primarily focus on financing projects which are eco-friendly, reduce carbon footprints or are environment

[64] *Environmental, Social and Governance (ESG)*, TechTarget, https://www.techtarget.com/whatis/definition/environmental-social-and-governance-ESG

centric in nature.[65] These instruments vary from government-based loans to investor-based series fundings. Startups which are focused on sustainability driven initiatives and innovations leverage green finance to secure funding while aligning their operations with global environmental goals.

Key green finance instruments include green bonds, green venture capital, green insurance, green credit, sustainability linked loans which offer incentives and loans for achieving or focusing on environmental performance depending on the type of instrument. In addition to this carbon credit and green investment funds focus on attracting impact-driven investors and provide startups avenues to offset emissions.

Some of the prominent avenues through which green finance is shaping a sustainable startup ecosystem in India:

Green Bonds: Green bonds can be defined as a debt instrument which is issued by the government, organizations or corporations to raise capital specifically for environmentally sustainable projects, assets or business activities. One of the key features of green bonds is earmarking funds which mean that during the process of issuance and fund raising, the proceeds are allocated to a specific green project. Apart from financing new initiatives, green bonds can also be utilized for refinancing existing debt which are potentially lowering capital costs and attracting further investments.[66] Green Bonds can be divided into various types of bonds such as Green Bonds, social bonds, sustainability bonds, sustainability-linked bonds which focus on various kinds of components through the use of proceeds.

Government Initiatives and Policies: Programs such as the National Adaptation Fund for Climate Change (NAFCC) and SIDBI's[67] Green finance scheme provide concessional loans and funding to eco-friendly startups and clean technology.

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[65] Renju Chandran & Sarath Chandran MC, *Green Finance and Sustainability: Mapping Research Development Through Bibliometric Analysis*, 5 Discover Sustainability 339 (2024), https://link.springer.com/article/10.1007/s43621-024-00549-z

[66] Stephen Kim Park, *Investors as Regulators: Green Bonds and the Governance Challenges of the Sustainable Finance Revolution*, 54(1) *Stanford J. Int'l L.* 1, 4 (2018);
Michael Doran & James Tanner, *Green Bonds: An Overview* (presentation, Baker McKenzie, May 2019) 4;
Justin Pugsley, *Regulators Starting to Catch Up with Green Bond Boom*, *Global Risk Regulator* (Sept. 13, 2016), https://www.globalriskregulator.com.

[67] Small Industries Development Bank of India

Green Credits: A credit-based incentive program for the environmental change makers which includes individuals, organizations and companies from diverse backgrounds. Participants in the program earn tradable credits upon completing sustainability-focused projects such as tree plantation, waste management, environmental conservation and ecosystem restoration. These credits can then be sold on a designated market platform. Green credit is not as widely recognized as green bonds, the empirical data indicate that the implementation in listed banks has a positive effect on Return on Assets and Return on Equity.[68]

Green Venture Capital: Investment Capital allocated to businesses which focus on developing and promoting sustainable products and services. These funds support both early-stage startups and established companies transitioning to low-carbon and eco-friendly operations. Typically sourced from private investors or venture capital firms, green VCs focus on providing financial support to businesses committed to reducing environmental impact while maintaining economic viability.[69]

Green Insurance: It is a type of insurance designed to promote environmentally friendly and climate-conscious behavior by offering economic incentives through its products and services. These incentives vary but share a common goal for encouraging sustainable practices. For instance, policyholders may receive premium discounts for adopting energy-efficient building designs, using pay-as-you-go vehicle insurance models or owning energy-saving vehicles. Essentially, green insurance policies align with the green investment concept, rewarding individuals and businesses which actively reduce their environmental footprint.[70]

ESG Integration: Environmental, social and governance considerations are becoming important in investment decision making keeping in mind the current climatic scenario. Green finance implements ESG criteria to calculate environmental performance, the impact of the startup in the society and corporate governance of companies, firms and startups. ESG profiles are one of the factors which investors focus on while assisting companies financially.

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[68] **Xi, B., Wang, Y., & Yang, M**., Green Credit, Green Reputation, and Corporate Financial Performance: Evidence from China, 29 *Envtl. Sci. & Pollution Res.* 2401, 2419 (2022).
[69] **Paul D. Reynolds**, *Catalyst for Sustainable Start-Up Success?*, 52 Technological Forecasting and Social Change 1 (2015), https://www.sciencedirect.com/science/article/pii/S0959652615006460 (last visited Apr. 22, 2025).
[70] **Inggang Perwangsa Nuralam et al.,** *Fostering Sustainable Entrepreneurship in Emerging Market: An Interdisciplinary Perspective* 54 (2023). https://book.futuresciencepress.com/index.php/FSPB/catalog/book/20

2.2.2: Key Criteria for Evaluating a Project as a "Green Venture"

Various governmental and non-governmental institutions have defined standards for evaluating whether a project aligns with environmental sustainability goals. These criteria not only ensure compliance with environmental standards but also facilitate access to green financing, government incentives and venture capital investments. This framework helps in identifying projects that contribute to climate resilience, energy efficiency, sustainable resource management and eco-friendly innovations. These parameters are vital as they work as a deciding factor whether a project would receive funding under the green finance mechanisms.

The Framework for Sovereign Green Bonds[71] *by the Department of Economic Affairs, Government of India classifies green finance into four different principles:*

- A project which encourages energy efficiency in resource utilization.
- Focuses on the reduction of carbon emissions and greenhouse gases
- Enhances climate adaptation and resilience
- Values and improves natural ecosystems and biodiversity especially with respect to the sustainable development goals.

A Green Finance Working Committee has been set up by the Ministry of Finance with representatives from ministries which are relevant and chaired by the Chief Economic Adviser, Government of India.[72] This working committee will be responsible for selection and evaluation of projects and other relevant works which are related to the framework.

In the quest of sustainability and environmentally sustainable initiatives, rating systems play a pivotal role. There are various rating systems and certifications which aim to foster sustainable practices but differ in methodologies, evaluation criteria and overall impact. Various mechanisms include GRIHA[73], IGBC[74] and rating mechanisms such as the GreenCo Rating System.

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[71] Department of Economic Affairs, Government of India, *Framework for Sovereign Green Bonds*, https://dea.gov.in/sites/default/files/Framework%20for%20Sovereign%20Green%20Bonds.pdf
[72] Vajiram & Ravi. *Sovereign Green Bonds Framework*. https://vajiramandravi.com/upsc-daily-current-affairs/prelims-pointers/sovereign-green-bonds-framework/
[73] Green Rating for Integrated Habitat Assessment
[74] Indian Green Building Council

GRIHA: The Green Rating for Integrated Habitat Assessment developed by The Energy and Resource Institute (TERI) and endorsed by the Ministry of New and Renewable Energy serves as India's national green rating system for infrastructures keeping in mind India's diverse climatic conditions, building typologies and socio-economic landscapes.

IGBC: The Indian Green Building Council which is established under the Confederation of Indian Industries offers multiple rating systems tailored for different projects including residential, townships and commercial development.

The Green Rating Co.: The Green Rating Co. stands as a body which consists of senior industry experts dedicated to promoting green practices in the country. With a mission to drive sustainability and environmental stewardship the council plays a pivotal role in guiding activities of green co. rating systems and shaping their certification.

10 key performance areas are focused on for evaluating and enhancing sustainable policies across India:[75]

- Energy efficiency
- Renewable energy
- Water conservation
- Greenhouse gas emissions reduction
- Waste management
- Material conservation
- Recycling & recyclability
- Green supply chain
- Product stewardship & life cycle assessment
- Innovation for environment and green infrastructure
- Ecology

2.3: Theories Relevant to Green Finance and Sustainable Investments in the startup ecosystem.

[75] GreenCo Rating System, https://greenco.in/aboutgreencorating.php (last visited Mar. 4, 2025).

2.3.1: Behavioral Finance Theory

Behavioral finance theory deals with psychological factors which influence financial behaviours and institutions.[76] Traditional finance assumes that the investor tends to act only rationally in order to maximize profits and utility. Behavioral finance on the other hand acknowledges that decision making is often swayed by cognitive biases and emotional influences.[77] Systematic errors such as overconfidence where investors tend to assume the ability and knowledge of investors and anchoring where investors rely too much on initial information are cognitive biases that generally impact investment decisions.[78]

Market fluctuations are often driven by fear and greed which leads to bubbles and crashes.[79] Probabilities on familiar patterns rather than data are shortcuts investors use while making investment decisions often termed as "Heuristic".[80] Struggles such as *equity premium puzzle* and *January effect* are market anomalies that are taken into account when behavioral finance is concerned.[81] Equity premium puzzle is a situation where returns are higher than expected and the January effect is a presumption that stock prices go high in the month of January.

In instances of green financing in startups, behavioral finance plays a vital role. Although there are disadvantages of cognitive biases by recognizing the biases, investors can make more informed decisions which ensures funds are directed towards truly viable and sustainable startups. One of the major disadvantages is overconfidence bias where the investors may overestimate potential of green startups which can further lead the investors to overvaluation and excessive risk taking. In addition to this, herd behaviour can be a major cause which would lead investors to follow trends rather than conduct thorough due diligence, potentially resulting in a green bubble where

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[76] **Richard Thaler**, Toward a Positive Theory of Consumer Choice, 1 J. Econ. Behav. & Org. 39 (1980), https://linkinghub.elsevier.com/retrieve/pii/0167268180900517

[77] **Robert Shiller**, Irrational Exuberance, in *The Efficient Market Hypothesis* (2012), http://www.palgraveconnect.com/doifinder/10.1057/9781137292216.0035

[78] **Amos Tversky** & **Daniel Kahneman**, Judgment under Uncertainty: Heuristics and Biases: Biases in Judgments Reveal Some Heuristics of Thinking under Uncertainty, 185 *Science* 1124 (1974) https://www.science.org/doi/10.1126/science.185.4157.1124 .

[79] **Daniel Kahneman** & **Amos Tversky**, Prospect Theory: An Analysis of Decision under Risk, 47 *Econometrica* 263 (1979), https://www.jstor.org/stable/1914185?origin=crossref

[80] *Supra, 77*

[81] **Eugene F. Fama** & **Michael C. Jensen** (Deceased), Separation of Ownership and Control, in *Foundations of Organizational Strategy* (Harvard Univ. Press 1998), and *J. L. & Econ.* Vol. 26, June 1983, available at SSRN: https://ssrn.com/abstract=94034 or http://dx.doi.org/10.2139/ssrn.94034.

unsustainable ventures receive disproportionate funding. Anchoring can lead investors to focus on past financial models which underestimate the profitability of sustainable businesses, limiting capital flows to genuinely impactful startups. However, through recognizing cognitive biases, investors can make informed decisions ensuring that the funds are directed towards truly viable and sustainable startups. It also helps drive ESG (Environmental, Social and Governance) as the changing societal values and ethical considerations increasingly influence investor behavior. Furthermore, framing effects can be a model to highlight the long-term financial and environmental benefits of green investments which attract capital to the sector. A balanced framework is what behavioral finance focuses on for mitigating irrational investment tendencies while providing growth.

2.3.2: Modern Portfolio Theory

Introduced by Harry Markowitz in the early 1950s laid the groundwork and became responsible for revolutionizing investment strategies by focusing on diversification, risk assessment and portfolio optimization to maximize the returns for a given amount of risk. The Modern Portfolio Theory is based on the principle that a portfolio's risk is influenced not just by individual asset risks but also a correlation between assets enabling investors to build diverse portfolios that achieve an "efficient frontier".[82] MPT[83] uses the mean-variance optimization framework which allows investors to calculate expected returns and risks, reinforcing the importance of allocation of assets in improving risk-adjusted returns.[84]

The **Capital Asset Pricing Model (CAPM)** extended MPT by establishing a link between an asset's systematic risk and the expected return which would aid investment decisions.[85] The ESG incorporation within MPT broadens risk and return dimensions, enabling sustainable investing while maintaining financial performance. ESG integration helps investors identify companies with regulatory risks, reputational damage or operational challenges due to unsustainable practices.[86]

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[82] **Edwin J. Elton** & **Martin J.** Gruber, Modern Portfolio Theory, 1950 to Date, 21 *J. Banking & Fin.* 1743 (1997), https://doi.org/10.1016/S0378-4266(97)00048-4.
[83] Modern Portfolio Theory
[84] **Eugene F. Fama** & **Kenneth R. French**, The Capital Asset Pricing Model: Theory and Evidence, 18 *J. Econ. Persp.* 25 (2004).
[85] **John Lintne**r, The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets, 47 *Rev. Econ. & Stat.* 13 (1965).
[86] Harry Markowitz, Portfolio Selection, 7 *J. Finance* 77 (1952), https://doi.org/10.2307/297597 .

ESG integration tends to accumulate low-carbon related risks and better resilience to resource scarcity, aligning sustainability with financial stability. ESG based portfolios reduce volatility and enhance diversification, contributing to improved long-term performance. Regulatory initiatives such as UN Principles for Responsible Investments further adoption of sustainable investment strategies which ensures portfolio resilience and alignment with global ethical standards.[87] SEBI's ESG disclosure norms and green bonds promote responsible investments, creating new opportunities for venture capitalists and institutional investors to fund eco-conscious startups.[88] However, initial risks and limited historical data on startups make diversification and structured portfolio approaches crucial for investors. By applying MPT, investors can balance financial and sustainability objectives fostering a robust funding ecosystem for India's next generation of Startups.

2.3.3: Risk Management Theory

Risk management theory deals with identifying, assessing and mitigating risks to bring out profitable results. RMT[89] provides a framework for an analysis of both financial and non-financial risks. While financial risks include market risks, credit risks, liquidity risks and operational risks.[90] Non-financial risk includes ESG concerns which are crucial in sustainability and institutional investment decisions. Effective ESG risk assessment helps investors safeguard against adverse outcomes while aligning portfolios with long-term sustainability goals. ESG criteria are divided into three basic categories, environmental such as climate change and pollution, social such as labour practices and cross-border relations and governance which includes leadership and ethical conduct. Regulatory risks, reputational damage and financial losses result in cases of poor management. ESG risks are assessed both in qualitative and quantitative manner.

2.3.4: Value Creation Theory

[87] *What Are the Principles for Responsible Investment?*, PRI, https://www.unpri.org/about-us/what-are-the-principles-for-responsible-investment
[88] **Heng Wang**, **Hong Zhao** & **Xunhua Su**, Is There a Green Premium? Evidence from the U.S. Stock Market, 65 J. BANKING & FIN. 269 (2016).
[89] Risk Management Theory.
[90] Financial Risk: The Major Kinds That Companies Face, Investopedia, https://www.investopedia.com/ask/answers/062415/what-are-major-categories-financial-risk-company.asp

In corporate finance, value creation amounts to the free cash flow a company generates over a specific term.[91] It examines how the organization generates value for stakeholders including society. This theory primarily focuses on the idea that value extends beyond only financial gains and extends to innovations, satisfaction of consumers, sustainability and social impact. Through utilization of resources efficiently, fostering innovations and creating ways so that the operations align with the strategic goals. Integration of non-financial factors has become increasingly relevant due to the change in the dynamics of the business models so that the companies stay relevant.[92] Through promotion of economic growth which benefits all the stakeholders including society, the value creation theory aligns with the approach of green finance mitigating risks associated with environmental degradation and meeting demands for eco-friendly products.[93] From a theoretical perspective, value creation theory is seen to align with stakeholder theory which recognizes that the success of a company relies on the fulfillment of the needs of all the stakeholders. Through the integration of sustainability into the financial models' companies would be able to achieve a greater brand reputation and be sustainable in the long run.[94]

2.3.5: Agency Theory

Agency theory which was formulated by Jensen and Meckling in the year of 1976 examines the principal-agent relationship with the primary focus on the conflict of interest that arise when agents who are entrusted with decision-making start prioritizing their personal goals over shareholder value. This misalignment often leads to excessive risk taking, manager's interest first or underinvestment. In order to mitigate such conflicts, companies implement corporate governance frameworks such as compensation structures, incentive-based activities and shareholder monitoring. Traditional financial models focus on short-term profitability, whereas sustainable finance emphasizes long-term environmental and social impact.

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[91] Sustainability: Sources of Value Creation, McKinsey, https://www.mckinsey.com/capabilities/strategy-and-corporate-finance/our-insights/sustainability-sources-of-value-creation

[92] Value Creation in Business: Importance, Concepts, & Examples, IMD (2023), https://www.imd.org/blog/marketing/value-creation-in-business/

[93] Sean Fleming, What Is Green Finance and Why Is It Important?, WORLD ECONOMIC FORUM (Nov. 9, 2020), https://www.weforum.org/stories/2020/11/what-is-green-finance/.

[94] **Riikka Tapaninaho** & **Johanna Kujala**, Reviewing the Stakeholder Value Creation Literature: Towards a Sustainability Approach, in *Social Responsibility and Sustainability: How Businesses and Organizations Can Operate in a Sustainable and Socially Responsible Way* 3 (Walter Leal Filho ed., 2019), https://doi.org/10.1007/978-3-030-03562-4_1

In models of green financing such issues occur when the managers tend to neglect sustainability commitments due to lack of immediate financial returns. Investors and regulatory bodies mitigate this through compensation mechanisms based on ESG criteria, sustainability reporting requirements and shareholder activism. Agency theory in Startups is particularly relevant since the rapid growth agenda tends to force managers or agents to exaggerate green initiatives in order to attract investors which often lead to green washing, a phenomenon where the efforts of environmentally friendly initiatives are often overstated or misrepresented. Transparent ESG reporting and sustainability-linked incentives, can help the managerial actions align with broader sustainability goals of the company.

2.3.6: Institutional Theory

Institutional theory focuses on how rules, norms and beliefs shape the organizational structures and decision-making.[95] The organizations focus on legitimacy within their environments which adapts market focus and external pressures. Institutional isomorphism is how organizations become similar due to coercive (regulatory), mimetic (imitative) and normative pressures.[96] Scott further categorized these pillars into regulatory (laws and compliance), normative (industry standards and expectations) and cultural cognitive (shared societal belief). This focuses on why companies align with the sustainability mandates in order to comply with the regulations and to maintain legitimacy in evolving financial and social landscapes. Institutional theory explains how regulatory, normative and cognitive pressures drive sustainable investment decisions. Regulatory pressures such as mandatory ESG disclosures tend to push investors towards organizations which are sustainability driven. The Spanish Court of Auditors, emphasized the institutional liability of financial regulators who fail to incorporate climate risk into systematic assessments[97]. Normative pressures lead organizations to adopt sustainable finance models to align with investor expectations and industry best practices.[98] Mimetic isomorphism can also lead to greenwashing.

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[95] **John W. Meyer** & **Brian Rowan**, Institutionalized Organizations: Formal Structure as Myth and Ceremony, 83 *Am. J. Sociology* 340 (1977), https://www.journals.uchicago.edu/doi/10.1086/226550.

[96] **P. J. DiMaggio** & **W. W. Powell**, The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields, 48 *Am. Sociol. Rev.* 147 (1983), https://doi.org/10.2307/3095102.

[97] **Banco de España Climate Risk Stress Testing Review**, Spanish Court of Auditors, Audit Report No. 1539/2022 (Tribunal de Cuentas, Spain, Dec. 2022).

[98] **W. Richard Scott**, *Institutions and Organizations: Ideas, Interests, and Identities* (Sage 1995); W. Richard Scott, Institutions and Organizations: A Critical Review of Research, 17 *Management* 136 (2014), http://www.cairn.info/revue-management-2014-2-page-136.htm

Thus, green finance mechanisms such as green bonds and impact investments, must incorporate stringent governance frameworks to ensure credibility and long-term sustainability.

2.3.7: Triple Bottom Line (TBL) Theory

The Triple Bottom Line (TBL) theory introduced by John Elkington (1994) which expands its reach to social and environmental impacts and goes beyond financial profits as their traditional performance metrics. Three key dimensions that TBL theory focuses on are people, planet and profit.[99] TBL theory focuses on achieving long-term sustainability unlike conventional business models which focus on short-term financial gains. TBL encourages firms to integrate corporate social responsibility, ethical governance and environmental stewardship into the operations of the business.[100]

Since green finance focuses on sustainable business models which generate positive social and environmental outcomes they align with the TBL principles through ensuring financial flows towards climate-friendly and socially responsible projects.[101] The startups which are driven by TBL values tend to leverage innovation and technology in order to create low-carbon solutions while ensuring fair labor practices and community engagement.[102] With the evolution of the global sustainability policies, TBL-driven startups will play a vital role in reshaping industries and driving the transition towards a low-carbon economy.

2.3.8: Socially Responsible Investment Theory

Socially responsible Investment theory brings a view that while making investments, investors not only focus on the short-term financial gain but also take an account of the ethical, social and environmental considerations.[103] The SRI approach integrates ESG criteria into financial analysis and encourages businesses to adopt sustainable practices to attract responsible investors. This

[99] **John Elkington**, *Cannibals with Forks: The Triple Bottom Line of 21st Century Business* (New Society Publishers 1998).
[100] **T. Slaper** & **T. Hall,** The Triple Bottom Line: What Is It and How Does It Work?, 86(1) Indiana Bus. Rev. 4 (2011).
[101] **Schoenmaker**, **D**., & **Schramade, W**. (2019). *Principles of Sustainable Finance.* Oxford University Press.
[102] **David Kiron** et al., *The Quest for Sustainable Business Model Innovation*, 58(4) MIT Sloan Mgmt. Rev. 11 (2017).
[103] **Luc Renneboog**, **Jenke Ter Horst** & **Chendi Zhang**, *Socially Responsible Investments: Institutional Aspects, Performance, and Investor Behavior*, 32 J. Banking & Fin. 1723 (2008).

theory is based on the foundation that a company which has a strong ESG commitment will enhance long-term profitability and contribute positively to the society.[104] Negative screening (excluding harmful industries like fossil fuels or tobacco), positive screening (favoring firms with sustainability initiatives) and impact investing are techniques investors following the SRI theory employ in their investment strategy.

Through promotion of capital allocation towards environmentally sustainable businesses and projects, socially responsible investment theory tends to push green finance into the mainstream.[105] Green bonds, sustainability linked loans and ESG driven investment funds are growing due to the increased awareness amongst consumers over climate change. Investors invest in companies that comply with global sustainability standards such as the UN Principles for Responsible Investment (PRI) and the Sustainable Development Goals (SDGs).[106] Startups benefit from such impact focused investments and by investors who follow socially responsible investment theory in their investment decisions.

2.3.9: Sustainable Development Theory

Sustainable development theory is a foundational stone to green finance. It advocates for a balanced approach to both economic growth and environmental protection. As per the Brundtland Report in the World Commission on Environment and Development in the year of 1987 which defined sustainable development as "meeting the needs of the present without compromising the ability of future generations to meet their own needs"[107] underscoring the importance of intergenerational equity. Three key pillars that surround sustainable development theory are economic, environmental and social sustainability.[108]

Startups which primarily focus on renewable energy, circular economies, and low-carbon solutions, play a vital role in promoting sustainability. Although they tend to face challenges which

[104] **Gunnar Friede**, Timo Busch & Alexander Bassen, *ESG and Financial Performance: Aggregated Evidence from More Than 2000 Empirical Studies*, 5 J. Sustainable Fin. & Inv. 210 (2015).
[105] **Eurosif**, *European SRI Study 2021* (2021), https://www.eurosif.org/news/eurosif-report-2021/ (last visited Apr. 18, 2025).
[106] **Paul Brest** & **Kelly Born**, When Can Impact Investing Create Real Impact?, 11(4) *Stan. Soc. Innovation Rev.* 22 (2013).
[107] World Commission on Environment and Development, *Our Common Future* (Oxford Univ. Press 1987).
[108] **Herman E. Daly**, *Beyond Growth: The Economics of Sustainable Development* (Beacon Press 1996).

include high capital costs, regulatory complexities and market competitions.[109] With the introduction of global sustainability frameworks such as the Paris Agreement and the UN Sustainable Development Goals (UN SDG) businesses that align with sustainable development principles have gained investor confidence and long-term resilience.[110] Governments and financial institutions are integrating sustainability criteria into their mechanism of funding which ensures that the businesses committed to green innovation receive necessary funding which encourages the businesses to adopt circular economy models, carbon neutral operations and clean technology innovations.

2.4 Green Entrepreneurship and Sustainable Business Models

Although there has been growth in the field of green entrepreneurship, the number of entrepreneurs focusing on eco-friendly products has been at an increasing level but has not grown at a pace sufficient to achieve the planned goal within the stipulated time frame. The notion of green startups has started receiving attention since the 1990s. Although existing literature has defined green startups in a lot of ways, there have been various questions that revolve around the notion. What consists of "green" entrepreneurship? What are the major characteristics of green entrepreneurship? When can a business be considered "green"? A green entrepreneur can either align an existing business with environmental goals or develop a business which focuses on green technology or is inherently green.

Dr. Alex[111] defines green enterprise as an enterprise based on the technology which is used in manufacturing across economic sectors or in terms of specific industries and firms which are engaged in sustainable production. The former is generally referred to as the process approach while the latter is referred to as the output approach.[112]

Anderson (1998) believes in the fact that entrepreneurship and environmentalism are rooted in the perception of value. Environmental concerns create areas of value which can be leveraged

[109] United Nations Environment Programme (UNEP), *The Financial System We Need: Aligning the Financial System with Sustainable Development* (2016).
[110] **John Elkington,** *Cannibals with Forks: The Triple Bottom Line of 21st Century Business* (Capstone Publ'g 1997).
[111] Associate Professor, Nehru College of Management, Coimbatore, Tamilnadu.
[112] **Dr. Alex Rajesh** & **Ms. Rakhi Mohan**, Green Entrepreneurship, 22 Think India J. 4145 (2019).

entrepreneurially. "Environmental Entrepreneurs" identify these opportunities and establish organizations which drive societal change in a meaningful manner.[113]

Volery (2002)[114] categorizes ecopreneurs into two types:

1. **Environment-conscious entrepreneurs** – Individuals who develop innovations, through their products, services or processes that reduce resource consumption and work towards achieving zero waste.
2. **Green entrepreneurs** – Entrepreneurs who are not environmentally aware but operate within the environmental sector and seize the opportunity which align with sustainability while ensuring profitability.

Green entrepreneurship is a branch of sustainable entrepreneurship which integrates economic, social and environmental considerations into the core components.[115] Green entrepreneurs tend to align their business objectives with ecological balance through strategies which not only tackle environmental challenges but also generate economic value through innovative resource management.[116] Through long-term effective risk management and creativity, success can be achieved in an unpredictable business environment.[117] With shifts in policies, consumer preferences and global environmental issues, the role of green entrepreneurs in meeting the changing demands of the modern world through sustainable solutions are the need of the hour.

2.4.1: Sustainable Business Models and Circular Economy

Through embedding sustainability into their core strategies green startups lead the way in redefining business models. Innovations in the business models enable these startups to integrate the environmental and social responsibility into their value creation, revenue generation and cost

[113] A.R.Anderson, Cultivating the Garden of Eden: Environmental Entrepreneuring, 11 J. Org. Change Mgmt. 135 (1998), https://doi.org/10.1108/09534819810212124.
[114] **Volery Thierry**, Ecopreneurship: Rationale, Current Issues and Future Challenges, 3 J. Org. Change Mgmt. 157 (2002).
[115] **Cohen Bennett** & **Winn Malcolm I.**, Market Imperfections, Opportunity and Sustainable Entrepreneurship, 22 J. Bus. Venturing 29 (2007), https://doi.org/10.1016/j.jbusvent.2004.12.001.
[116] **Song Wen, Yu Hongbo** & **Xu Haibin**, Effects of Green Human Resource Management and Managerial Environmental Concern on Green Innovation, 24 Eur. J. Innovation Mgmt. 951 (2021).
[117] **Zucchella Antonella** & **Previtali Pietro**, Circular Business Models for Sustainable Development: A "Waste is Food" Restorative Ecosystem, 28 Bus. Strategy & Env't 274 (2019).

structures. Through eco-friendly value propositions, such as biodegradable products, clean technologies and materials which are eco-friendly, green startups innovate the traditional business models into a more sustainable one.[118]

Alternative revenue streams such as carbon-offset programs, green product certifications and per-per use models are promoting sustainability while also aligning their objectives with financial viability.[119] Through mechanisms such as supply chain, waste reduction, renewable energy adoption and responsible allocation of resources, cost efficiency and operational resilience are enhanced.[120] In addition to strengthening the reputation of the brand, the integration of sustainability into business models, ensures compliance with stakeholders ranging from regulatory authorities, market players and consumers.

One of the fundamental components of sustainable business models is the incorporation of circular economy principles which focuses on various aspects of climate based initiative which includes resource efficiency, waste minimization and regenerative design.[121] Circular economy has been defined by Ellen MacArthur Foundation, introducing the Circular Economy as "an industrial economy that is restorative or regenerative by intention and design"

Circular business models focus on adopting closed-loop systems in which materials and products are repurposed or recycled. Key areas which require modification for a shift from a linear to a circular economy are product development, marketing strategies, global reverse network along with enabling factors and organizational structures.[122] Adopting a circular approach is based on the principle of "Reduce, Reuse and Recycle" which is essential for closing the loop within financial systems.[123] With the changing stakeholder expectations, the circular economy is now a

[118] **Stefan Schaltegger , Lüdeke-Freund Florian** & **Hansen, Erik G.**, Business Models for Sustainability: A Co-Evolutionary Analysis of Sustainable Entrepreneurship, Innovation, and Transformation, 6 Organ. & Env't 264 (2016)

[119] **Frank Boons** & **Florian Lüdeke-Freund**, Business Models for Sustainable Innovation: State-of-the-Art and Steps Towards a Research Agenda, 63 J. CLEANER PROD. 9 (2013).

[120] **Nancy Bocken**, **Samuel W. Short**, **Padmakshi Rana** & **Steve Evans**, *A Literature and Practice Review to Develop Sustainable Business Model Archetypes*, 65 *J. Cleaner Prod*. 42 (2014)

[121] **Guido Geissdoerfer**, **Paulo Savaget**, **Nancy M.P. Bocken** & **Erik Jan Hultink**, *The Circular Economy – A New Sustainability Paradigm?*, 143 *J. Cleaner Prod*. 757 (2017).

[122] **Rayeda AlAhbabi** & **Haitham Nobanee**, Sustainability Bonds: A Mini-Review, SSRN (Feb. 18, 2020), https://ssrn.com/abstract=3540119 or http://dx.doi.org/10.2139/ssrn.3540119.

[123] **Martin Geissdoerfer** et al., The Circular Economy – A New Sustainability Paradigm?, 143 J. Cleaner Prod. 757 (2017), https://linkinghub.elsevier.com/retrieve/pii/S0959652616321023

strategic advantage for a lot of startups. It is now a necessity for ensuring environmental alignment and long-term sustainability.

2.5 ESG Compliance and Its Impact on Startups

In the recent era, Environmental, Social and Governance (ESG) principles emerged as a critical factor in shaping corporate sustainability, regulatory compliance and investment attractiveness. While ESG frameworks were developed primarily to guide multinational companies in addressing the environmental and social concerns, their importance is now extended to startups. Both in terms of investment and development, ESG criteria are no longer an optional consideration but a fundamental aspect of strategic growth and risk management. Despite limited resources, startups tend to incorporate ESG principles into their operational and governance structures due to the growing pressure from stakeholders. For an organization to be viable in long-term sustainable business practices, social responsibility and ethical governance are key determinants to decide an organization's long-term sustainability.

As the investment decisions shift to incorporating environmental, social and governance (ESG) framework into the decision-making process of the investors, sustainability has become a crucial element in attracting funding for startups. In recent days, sustainability performance of a startup plays a significant role in determining whether investors choose to fund one company over another and the capital that a company can secure. Access to financial resources are essential for the survival and growth of startups since the primary challenge for startups in financial stability. While Environmental and social factors receive considerable attention, governance is often overshadowed by economic considerations which are becoming increasingly relevant in understanding a startup's long-term success.[124]

2.5.1: ESG Compliance in Startups and Funding mechanism

Startups generally receive funding at various stages of their business and operations each focusing on a specific level of growth. When the startup is at the initial stage funding often is through bootstrapping, personal savings or through friends and family where the focus is to develop a

[124] **Gianluca Dallafina**, Start-ups and Sustainability: The Relationship Between the ESG Criteria and the Amount of Fundings Raised by Start-ups (2021) (Master's thesis, Master's Degree Programme in Management, Accounting & Finance, Ca' Foscari Univ. of Venice supervised by Ch. Prof. Daria Arkhipova).

minimum viable product and conduct market research on the product market fit. Once the business finds a product market fit, startups seek pre-seed or seed funding which is primarily provided by angel investors or early-stage venture capital (VC) firms. These investors assess various factors such as scalability of the business, market potential and the founding team.[125] It is at this stage when ESG-conscious startups focus on sustainability principles in order to attract impact investors and green funds which enhances the long-term environmental and social benefits of the organization.[126] With the progress in the business of startups, it enters the Series A,B and C funding rounds which focus at scaling the business each coming at an alphabetical order. Series A funding is led by VC firms who are looking for startups with an airtight revenue model and a significant user growth. International expansion, product diversification and strategic partnership is what Series B and C focuses on and it involves larger institutional investors and private equity firms. Several countries including Switzerland have put an emphasis on increasing accountability for institutional investors under international ESG norms and sustainable finance standards[127]. Environmentally aligned startups benefit through funding from green venture capital firms, sustainability-focused private equity, and ESG-driven crowdfunding platforms.[128] For ensuring compliance with the ever evolving regulations across the environment and for attracting institutional and public market investors companies often pursue mezzanine financing, private placement and initial public offerings (IPOs) as their key exit options. Strong ESG credentials enhance both the confidence of the investor and contribute to long-term market sustainability and increases the valuation of the company.[129]

Startups must adhere to global sustainability reporting frameworks which ensure standardized ESG disclosure guidelines. The Global Reporting Initiative (GRI), Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-Related Financial Disclosures (TCFD) are bodies

[125] **A. M. Robb** & **D. T. Robinson**, The Capital Structure Decisions of New Firms, 27 REV. FIN. STUD. 153, 153-79 (2014).
[126] **F. Bergset** & **K. Fichter**, Green Start-ups – A New Typology for Sustainable Entrepreneurship and Innovation Research, 60 J. Innovation & Sustainability 118-144 (2015).
[127] **Global Legal Action Network (GLAN) & Business and Human Rights Resource Centre (BHRRC) v. Swiss National Bank**, OECD National Contact Point for Switzerland, Specific Instance No. CHE-2021-GLAN-BHRRC, filed May 2021 (pending).
[128] **E. Macchiavello**, **M. Siri** & **M. Migliavacca**, Sustainable Finance and ESG Disclosure: Regulatory Trends and Their Impact on Startups, 30 European Bus. Org. L. Rev. (2020).
[129] **Robert G. Eccles, Ioannis Ioannou** & **George Serafeim**, The Impact of Corporate Sustainability on Organizational Processes and Performance, 60 Mgmt. Sci. 2835 (2014).

which have set specific ESG reporting standards which investors rely on while evaluating a business as sustainable. In addition to this, the European Union's Corporate Sustainability Reporting Directive (CSRD) requires startups and corporations to disclose their ESG related risks and climate-related financial information.[130] Through incorporation of ESG compliance early in their operations, startups not only mitigate regulatory risks but also enhance the confidence of the investor and the financial stability of the organization and reduce growing tension between sustainability goals and regulatory compliance, especially for public and quasi-public financial institutions.[131]

2.5.2: ESG as a Catalyst for Startup Growth

Various research on ESG compliance and their effect on startups have had contradicting opinions. While some studies focused on the benefits of sustainability-driven initiatives, others discuss the challenges associated with integration of ESG into the ecosystem. While startups adopting ESG principles often have a competitive advantage in securing investments and expanding the market reach. Compliance can also introduce financial burdens, regulatory complexities and operational challenges which may hinder growth. Inaccurate ESG disclosures can trigger investor lawsuits and regulatory action, emphasizing the need for startups to ensure accurate sustainability claims to retain venture trust.[132]

Since modern stakeholders expect businesses to be economically, socially and environmentally viable, incorporating strong environmental, social and economic practices to the startup can help the organization achieve better performance and long-term competitiveness.[133] Alternative funding sources such as business angels, green venture capital firms, social banks, and crowdfunding platforms can also be leveraged when the business model emphasizes sustainability and has a positive environmental and social impact. With a competitive advantage, these startups tend to secure higher investment amounts as compared to traditional startups. There is a strong correlation between sustainability initiative and startup innovation. Startups which implement ESG practices

[130] **Stefan Schaltegger** & **Marcus Wagner**, *Managing the Business Case for Sustainability: The Integration of Social, Environmental and Economic Performance* (Routledge 2017).
[131] **Sveriges Riksbank v. European Supervisory Authorities**, Case T-710/21, 2021 E.C.R. II-00000 (Gen. Ct. of the EU).
[132] **Securities and Exchange Commission v. Vale S.A.**, No. 1:22-cv-02405, E.D.N.Y. (2023).
[133] *Supra, 124*

leverage digital platforms to enhance accessibility, reduce cost, improve service delivery and create new employment opportunities.[134] Companies which prioritize sustainability gain access to new consumer segments as environmentally conscious customers and corporate clients increasingly prefer businesses that demonstrate social and environmental responsibility.[135] Regulatory shutdown due to environmental damage underlined the importance for startups, especially in manufacturing or clean-tech, to integrate strong ESG compliance to avoid funding setbacks or investor exit.[136]

Despite the advantages, ESG compliance brings significant challenges which may hinder startup growth. The high cost of implementation is a pressing issue. The SEC's fine for greenwashing sent a clear message to fintech and ESG-aligned startups that overstated sustainability credentials can invite penalties and erode investor confidence.[137] A substantial financial investment is required to integrate sustainable business practices into an early-stage startup with limited capital. In addition to this, the need for specialized expertise in ESG reporting, sustainability assessments and regulatory compliance further increases operational costs increasing the challenges the business face for their survival.[138] The lack of standardization in ESG metrics and reporting framework and concerns with respect to greenwashing can negatively impact startups. While a lot of investors actively seek ESG-compliant businesses others remain cautious due to the often-exaggerated sustainability claims.

ESG compliance offers significant advantages to startups in avenues such as funding, innovation and market differentiation but also has financial and regulatory challenges. Navigating these complexities strategically can maximize benefits while ensuring long-term sustainability and growth.

2.6: Conclusion

[134] **Michela Piccarozzi**, *Does Social Innovation Contribute to Sustainability? The Case of Italian Innovative Start-Ups*, 9 Sustainability 2376 (2017).
[135] **Robert G. Eccles** & **Michael D. Kastrapeli**, *How Principles and Pragmatism Can Create Sustainable Value through ESG*, State Street, at 4–27 (2017).
[136] **Vedanta Ltd. (Sterlite Copper) v. Tamil Nadu Pollution Control Board**, Appeal No. 161/2018, NGT (India)
[137] **Securities and Exchange Commission v. DWS Investment Management Americas, Inc.**, No. 1:23-cv-08261, S.D.N.Y. (2023).
[138] *Supra, 128*

Chapter 2 provides a robust framework for understanding green finance and its role in driving sustainable development. The chapter begins by defining green finance as an umbrella term which deals with various financial instruments, policies and investment strategies which focuses on directing resources towards projects which are environmentally sustainable. The chapter highlights the fact that green finance is more than just another financial mechanism, it is about facilitating a low-carbon sustainable economy. The historical evolution of green finance for UNFCCC, Kyoto Protocol, Paris Agreement and the recent COP 28 & COP 29 to the institutionalization of green finance mechanisms in response to global commitments like Kyoto Protocol and Paris Agreement.

The chapter also underlines the differences in traditional investment and green finance, where traditional investments has prioritized short-term profits and market stability, green finance focuses on long-term stability and environmental sustainability. Various theories such as behavioral finance theory, modern portfolio theory with respect to traditional financial theories are discussed. Lastly, this chapter discusses the integration of artificial intelligence in improving the mechanism of green finance and creating a holistic development of the economy and the environment.

CHAPTER 3

REGULATORY FRAMEWORK FOR GREEN FINANCE IN INDIA

"Regulations should not just guide finance, they should inspire it. A regulated world where sustainability thrives is the only kind of world we want."[139]

3.1: Overview of India's Green Finance Landscape

As per the report of 2024 by the World Economic Forum, extreme weather conditions are the most pressing long-term threat for the next decade.[140] 2024 was likely the first calendar year to exceed 1.5° C temperature above the pre - industrial era.[141] This extreme weather conditions led to the highest number of displacements recorded in a year since 2008 according to data by the UN's world meteorological organization. A report by Down to Earth[142] stated that the greenhouse concentration in the atmosphere reached the highest point in the last 8,00,000 years. Due to climate-related factors, India suffered a loss amounting to $ 159 billion or 5.4% of its GDP. The United Nations Economic and Social Commission for Asia and Pacific projects that under high-emission scenario's climate change in India could cost up to 35% of its GDP by 2100 compared to 24% for developing nations.[143]

Green Finance plays a vital role in the shift to net zero emissions. As outlined earlier in Chapter 1.2, while India's climate goals demand substantial investment, there remains a significant shortfall. Current green finance flows cover only a fraction—around 30%—of the mitigation funding needed. Additionally, adaptation measures will require an estimated cumulative

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[139] **Mark Carney**, Former Governor of the Bank of England

[140] **Ulka Bhattacharyya**, *Understanding the Regulatory Framework for Sustainable Finance in India*, **NLS BLR** (2024), https://www.nlsblr.com/post/understanding-the-regulatory-framework-for-sustainable-finance-in-india.

[141] Online Desk, *Extreme Weather Events in 2024 Led to Highest Number of New Displacements Recorded in a Year since 2008: UN*, **The New Indian Express** (2025), https://www.newindianexpress.com/world/2025/Mar/20/extreme-weather-events-in-2024-led-to-highest-number-of-new-displacements-recorded-in-a-year-since-2008-un

[142] **Andrew King** & **Ashcroft Linden**, *Flooding in the Sahara, Amazon Tributaries Drying and Warming Tipping over 1.5°C — 2024 Broke All the Wrong Records*, **Down to Earth** (2025), https://www.downtoearth.org.in/climate-change/flooding-in-the-sahara-amazon-tributaries-drying-and-warming-tipping-over-15c-2024-broke-all-the-wrong-records

[143] *Economic Costs of Climate Change in India and Policy Responses*, **ET EnergyWorld**, https://energy.economictimes.indiatimes.com/news/renewable/economic-costs-of-climate-change-in-india-and-policy-responses/111802551

investment of INR 85.6 trillion (USD 1 trillion) by 2030, translating to about INR 5.7 trillion (USD 67 billion) annually. A significant increase in green financing and its adaptation is necessary to mitigate the impacts of climate change.[144] At COP 26, India mapped out ambitious goals which included enhanced 2030 NDCs achieving energy independence by 2047 and a commitment to reach net zero by 2070.[145]

A series of public sector initiatives have significantly bolstered India's commitment to sustainable development and climate resilience. These initiatives encompass policy framework, financial mechanisms and strategic collaboration designed to mobilize resources for projects that are environmentally sustainable. A robust policy framework was established to lead the nation towards a greener economy. The National Action Plan on Climate Change (NAPCC) which outlines strategies to promote sustainable development while focusing on climate change.

NAPCC is based out of eight national missions[146] on climate change which was outlined on 30th June, 2008. The government has implemented the National Clean Energy Fund (NCEF), financed through a levy on coal production and imports.[147] This fund primarily focuses on funding research and innovative projects in clean energy technologies, thereby facilitating the transition to a low carbon economy.[148] In the year 2022, India issued their first sovereign green bond. This initiative aligns with the International Capital Market Associations.[149] Green bond principles which ensures transparency and accountability in utilization of proceeds. Through renewable energy installation, clean transportation mechanisms / infrastructure and sustainable water management systems. The

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[144] *Supra, 2*
[145] *Green Indian Financial Systems Initiative*, **Shakti Sustainable Energy Foundation**, https://shaktifoundation.in/green-indian-financial-systems-initiative/.
[146] National Solar Mission
National Mission for Enhanced Energy Efficiency
National Mission on Sustainable Habitat
National Water Mission
National Mission for Sustaining the Himalayan Ecosystem
National Mission for a Green India
National Mission for Sustainable Agriculture
National Mission on Strategic Knowledge for Climate Change
[147] *Climate Change Programme*, **Department of Science & Technology, Government of India**, https://dst.gov.in/climate-change-programme
[148] *National Clean Energy & Environment Fund (NCEEF): Brief Post Budget Estimates 2017–18*, Department of Expenditure, Ministry of Finance, Government of India, https://doe.gov.in/files/circulars_document/NCEF_Brief_post_BE_2017_18.pdf
[149] *Framework for Sovereign Green Bonds*, Department of Economic Affairs, Ministry of Finance, Government of India, https://dea.gov.in/sites/default/files/Framework%20for%20Sovereign%20Green%20Bonds.pdf

issuance of sovereign green bonds not only diversifies the funding source by government but also sets a benchmark for other entities considering green financing options.

Investment across the private sector plays a crucial role in creating a sustainable ecosystem and scaling green finance in India. Since 2015 Indian entities have issued green bonds totaling approximately $21 billion as of 2023. 84% of the issuance was led by the private sector.[150] Organizations like ReNew Global raised $400 million through senior secured green bonds in April 2023, reflecting strong demands from global investors.[151]

Although the energy sector attracted over $13 billion investment last year, it is quite less than the required $68 billion annually to achieve the target of 500 GW of non-fossil fuel power by 2030.[152] Challenges such as project commissioning delays, land acquisition issues, regulatory hurdles, and negative risk perceptions persist in the industry delaying the process of change.

Indian regulatory bodies like the Reserve Bank of India plan to ease the process of green financing through the inclusion of a framework for green deposits and disclosure requirements on climate-related financial risks.[153]

The Securities Exchange Board of India, in the year 2023 introduced the 'BRSR[154]' Core framework in July, 2023 which mandated enhanced ESG disclosures for the top 1,000 listed companies to improve transparency and attract responsible investment.[155] Through blended financial mechanisms, enhanced public-private partnership and enhancing climate risk assessment

[150] World Bank, India Incorporates Green Bonds into Its Climate Finance Strategy, WORLD BANK BLOGS (Feb. 2023), https://blogs.worldbank.org/en/climatechange/india-incorporates-green-bonds-its-climate-finance-strategy.
[151] ReNew Energy Global, ReNew Raises $400 Million Through Issuance of Green Bonds, Sees Strong Demand from Global Investors, **REUTERS** (Apr. 2023), https://www.renew.com/press-release/renew-raises-400-million-through-issuance-of-green-bonds.
[152] **Financial Times**, *India's Renewable Energy Investment Falls Short of Climate Targets*, **FIN. TIMES** (Mar. 2024), https://www.ft.com/content/dabfeb72-f3ed-4207-b498-1c1d5c103ef2.
[153] **The Economic Times**, *RBI to Unveil Guidelines on Green Financing*, **ECON. TIMES** (Jan. 2024), https://economictimes.indiatimes.com/news/economy/policy/reserve-bank-of-india-to-unveil-guidelines-on-green-financing/articleshow/97722596.cms.
[154] Business Responsibility and Sustainability Report.
[155] Securities and Exchange Board of India (SEBI), *BRSR Core Framework for ESG Disclosures*, SEBI (July 2023), https://www.sebi.gov.in/legal/circulars/jul-2023/brsr-core-framework-for-assurance-and-esg-disclosures-for-value-chain_73854.html.

mechanisms we can mobilize the estimated $1.05 trillion needed by 2030 to adapt industries to climate norms.[156]

3.2: Role of SEBI, RBI, and Other Regulatory Bodies

3.2.1: Role of SEBI

In recent times, Securities and Exchange Board of India (SEBI) has recognized the role of capital markets in promoting environmental sustainability and implemented initiatives to boost green financing and ensure transparency in sustainable investments. Activities like the BRSR framework, regulation on green bonds, ESG related guidelines on mutual funds has made SEBI, a leading regulatory body in promoting sustainability in the Indian financial market.

With the rising need for sustainable finance SEBI implemented the Business Responsibility and Sustainability Reporting (BRSR) framework which replaced the BRR framework. The BRSR framework was brought into life to mandate the top 1000 listed entities on the basis of their market cap to disclose ESG initiatives focusing on maintaining transparency disclosures.[157] In addition to the BRSR framework, SEBI acted as a facilitator in the issuance of green bonds whose primary aim is to finance projects with clear environmental benefits and energy efficiency initiatives. SEBI in its guidelines specified eligibility criteria for green bonds, disclosure norms and reporting standards.[158] Apart from enhancing the confidence of the investor, these bonds act as a facilitator in creating a green ecosystem. The mandated disclosures by the asset management companies on the integration of ESG into their investment strategies ensuring that sustainability principles are taken into account while they make investment decisions.[159]

The Securities and Exchange Board of India (SEBI) has played a pivotal role in promoting green financing for the Indian startup ecosystem predominantly through the Alternative Investment

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[156] Reuters, *India Central Bank Chief Urges Common Pool for Climate-Focused Projects*, REUTERS (Mar. 2025), https://www.reuters.com/sustainability/sustainable-finance-reporting/india-central-bank-chief-urges-common-pool-climate-focused-projects-enhance-2025-03-13/.

[157] Securities and Exchange Board of India, *Business Responsibility and Sustainability Reporting by Listed Entities* (2021), https://www.sebi.gov.in.

[158] Securities and Exchange Board of India, *Disclosure Requirements for Issuance and Listing of Green Debt Securities* (2017), https://www.sebi.gov.in.

[159] Securities and Exchange Board of India, *Circular on ESG Disclosure Standards for Mutual Funds* (2022), https://www.sebi.gov.in.

Funds (AIF) regulations.[160] Through the eased compliance mechanisms and the constant encouragement that venture capitalists are receiving to focus on ESG - focused businesses, SEBI has enabled startups in the renewable energy, waste management and sustainable agriculture sector to access funding. Thematic ESG funds have led startups to secure capital from institutional investors committed to sustainability.

3.2.2: Role of RBI

Due to extreme weather conditions, environmental degradation and the unrealistic impact of climate change, the Reserve Bank of India has brought in several measures in promoting sustainable finance within the banking system of India. In March, 2025, the Reserve Bank of India revised guidelines on priority sector lending (PSL) and included renewable projects to enhance credit limits for ventures which are environmentally sustainable[161]. These revisions encouraged banks to increase funding for green projects, supporting the climate goals of India.

In the month of July, 2022, the Reserve Bank of India brought a discussion paper on climate risk and sustainable finance focusing on the need for banks to integrate climate-related financial risks into their operations. In addition to this, the RBI has encouraged the introduction of green deposits, enabling consumers to dispatch funds towards projects that are environmentally sustainable. The recent framework of the Reserve Bank of India in 2023 asked banks to issue green deposits having clear disclosure requirements ensuring that their impacts are effectively measured. The Reserve Bank of India has promoted green financing for startups primarily through priority sector lending (PSL) norms, which include increased loan limits for renewable energy projects.

The introduction of Green Finance Lines of credit has provided startups in clean technology, sustainable infrastructure and environmental solutions with easier access to credit at favorable interest rates. Beyond the Reserve Bank of India, institutions like the Small Industries Development Bank of India (SIDBI) have launched the Green Climate Fund which helps early stage startups to collect venture debt and further develop sustainable innovations. The Climate

[160] Securities and Exchange Board of India, *Alternative Investment Funds Regulations, 2012*, https://www.sebi.gov.in/legal/regulations/feb-2023/securities-and-exchange-board-of-india-alternative-investment-funds-regulations-2012-last-amended-on-february-07-2023-_69231.html

[161] Reserve Bank of India, *Priority Sector Lending Guidelines – Inclusion of Renewable Energy* (2025), https://www.rbi.org.in.

Resilient Agriculture Program of the National Bank for Agriculture and Rural Development. has facilitated funding for agri-tech startups focusing on conservation of water and eco-friendly farming practices. These initiatives help green finance receive the financial support which is needed to drive innovation and contribute to India's sustainability goals.

3.2.3: Other Regulatory Bodies and Green Finance Initiatives

In addition to the Securities Exchange Board of India and Reserve Bank of India, there are other authorities and initiatives in India which have taken up activities in order to promote sustainable finance. Organizations like the IRDAI[162] and the PFRDA[163] are promoting environmental sustainability through sustainable financing mechanisms.

The Insurance Regulatory and Development Authority of India (IRDAI)[164] has encouraged companies engaged in insurance as a service to integrate ESG factors into their investment portfolios. IRDAI has also supported parametric insurance policies which are designed to mitigate the risks associated with climate-change induced disasters. The Pension Fund Regulatory and Development Authority (PFRDA)[165] has been into constant research as to how ESG factors can be integrated into pension fund investments.

Through incorporation of sustainability linked investments, the PFRDA focuses on aligning retirement savings with long-term sustainable development goals. The government of India has issued sovereign green bonds in 2023 to mobilize funds for public sector projects with environmental benefits. Private sectors take precedence from these bonds which encourage broader participation in green financing and establish India as a leader in sustainable investment.

3.3: Existing Environmental Laws and Green Finance Regulations

[162] Insurance Regulatory and Development Authority of India
[163] Pension Fund Regulatory and Development Authority
[164] Ins. Regul. & Dev. Auth. of India, *Discussion Paper on Climate Risk and Sustainable Finance* (2023), https://www.irdai.gov.in.
[165] Pension Fund Regul. & Dev. Auth., *ESG Framework for Pension Funds: Analyzing Sustainable Investment Trends* (2022), https://www.pfrda.org.in.

3.3.1: Legal frameworks on Environments and Green Finance

A country like India can only achieve its sustainability goals if the environmental goals run parallel to the economic goals and growth of the country. The case of *"Indian Council for Enviro-Legal Action v. Union of India"*[166], had set precedent for the economic internalization of environmental externalities, vital for structuring green finance risk models.

To foster a low-carbon economy, India has to focus on projects which are environmentally sustainable and allocate financial resources to it. Legislations on both imposing compliance requirements and encouraging investments in green businesses exist but the implementation is still a distant dream. While there have been activities in recent times for a greener future, there is still a lot that needs to be done.

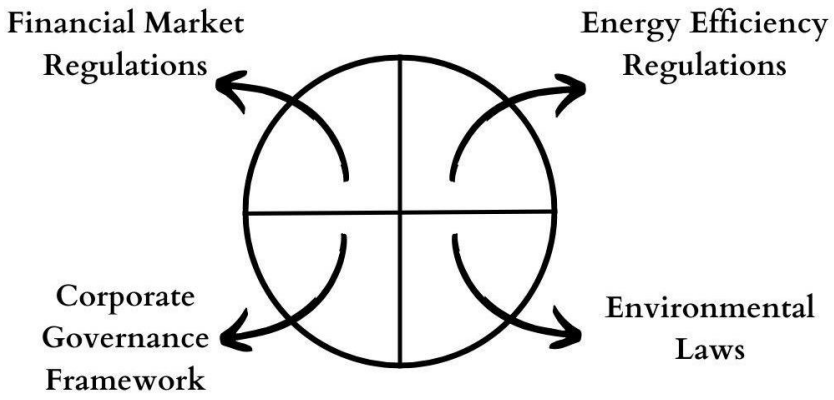

Fig 3.1 shows key types of laws shaping green finance.

Fig 3.1 represents the various types of legal frameworks that play a major role in enhancing green finance mechanisms in India. Under these frameworks, significant laws and regulatory mechanisms together define whether a business falls under the category of eco-friendly business and can avail green financing or not. The Environmental Protection Act of 1986, The Water (Prevention and Control of Pollution) Act, 1974, The Water (Prevention and Control of Pollution) Act, 1974, The Air (Prevention and Control of Pollution) Act, 1981, The Energy Conservation Act, 2001, The Companies Act, 2013, Securities and Exchange Board of India (SEBI) Green Bond

[166] **Indian Council for Enviro-Legal Action v. Union of India**, (1996) 3 SCC 212 (India)

Regulations, The Reserve Bank of India's Sustainable Finance Initiatives, and other government-led initiatives such as the Sovereign green bonds and the National Solar Mission are the regulatory frameworks that shape green finance.

The Environmental Protection Act, 1986[167]

The Environmental Protection Act of 1986 is one of the core legislations when environmental agendas are dealt with in the country. This Act came as a response to the Bhopal Gas Tragedy. This Act provides power to the central government for regulating activities of industries which pose a threat to the environment. The case of *"A.P. Pollution Control Board v. Prof. M.V. Nayudu"*[168] laid the groundwork for scientific environmental risk assessment, urging that environmental standards be integrated into project financing and industrial licensing. Supported policy shifts that promote green finance through regulatory alignment.

With a primary focus on the establishment of environmental standards, pollution control measures and penalties for non-compliance, Environmental Impact Assessment (EIA) is calculated through understanding the impact of a development project or activities which it can have on the environment.

In addition to the Environmental Impact Assessment, the Act empowers regulatory bodies such as the Central Pollution Control Board and State Pollution Control Board to overlook the compliance mechanisms on the environment which makes it easier for businesses to operate under a transparent regulatory framework. Financial institutions often focus on the environmental clearance status before extending loans to startups which promote eco-friendly initiatives.[169]

The Water (Prevention and Control of Pollution) Act, 1974 & The Air (Prevention and Control of Pollution) Act, 1981[170]

In a country with rapid industrialization, and a dense population, like India, significant challenges persist in addressing issues of water and air pollution. The government enacted the Water Act of

[167] The Environmental Protection Act, No. 29 of 1986, § 3, INDIA CODE.
[168] **A.P. Pollution Control Board v. Prof. M.V. Nayudu**, (1999) 2 SCC 718.
[169] Ministry of Env't, Forest & Climate Change, EIA Notification, 2006 (Sept. 14, 2006), https://www.moef.gov.in.
[170] The Air (Prevention and Control of Pollution) Act, No. 14 of 1981, § 19, INDIA CODE.

1974 and Air Act of 1981 which focuses on control measures through pollution control certificates which are mandated by the CPCB[171] and SPCB[172] for businesses which are planning to avail green financing opportunities in water conservation technologies, air purification solutions and pollution monitoring systems. Venture capital firms and banks are prioritizing investments in climate tech startups and cleaner technology which focus on developing innovative solutions to address water and air pollution. In addition, compliance to these laws is often a prerequisite for accessing green bonds, sustainability-linked loans and government subsidies. The case of *"M.C. Mehta v. Union of India"*[173] financial responsibility of industries under the Water Act for discharging untreated effluents into the Ganga River. Initiated the principle that access to finance can be regulated through pollution control compliance, linking environmental permits to investment approvals.

The Energy Conservation Act, 2001[174]

The Energy Conservation Act of 2001 primarily enacted to create sustainable energy for industrial use and promote energy efficient industries. With the establishment of the Bureau of Energy Efficiency (BEE), the Act tends to develop standards for consumption of energy and further incentivize businesses which adopt clean technology. One of the mechanisms provided in this Act is the Perform, Achieve and Trade (PAT) scheme. Where businesses are allowed to trade Energy-saving certificates and sell off the surplus to organizations who fail to meet their energy efficient targets.[175] In the case of *"IndusInd Bank Ltd. v. Union of India"*[176], discussions arose on whether banks should integrate energy conservation parameters in credit appraisal for infrastructure loans—key to operationalizing green lending practices.

Startups who focus on green ventures, like energy-efficient appliances, smart grids and renewable energy solutions benefit significantly from the PAT scheme. The Act also facilitates carbon credit markets where businesses can trade carbon reduction certificates. Carbon trading platforms in

[171] Central Pollution Control Board
[172] State Pollution Control Board
[173] **M.C. Mehta v. Union of India**, (1988) 1 SCC 471 (Ganga Pollution Case I).
[174] The Energy Conservation Act, No. 52 of 2001, § 2, INDIA CODE
[175] Bureau of Energy Efficiency, Perform, Achieve & Trade (PAT) Scheme Overview (2023), https://beeindia.gov.in.
[176] **IndusInd Bank Ltd. v. Union of India**, W.P. (C) No. 5594/2012, Delhi High Court

India have further strengthened green finance opportunities for startups focusing on carbon capture and sustainable energy.

The Companies Act, 2013[177]

The Companies Act of 2013 does not mandate disclosures or investment by startups. The Act mandates corporate social responsibility measures for companies with a net worth of rupees five hundred crore or more, or turnover of rupees one thousand crore or more or a net profit of rupees five crore or more during the immediately preceding financial year shall create a corporate social responsibility committee and need to allocate at least 2% of their average net profit towards socially beneficial activities which includes environmental activities as per schedule VII.[178]

The CSR framework has been a boon for corporations who invest in green startups, clean energy projects and environmental conservation programs. With changing dynamics across the globe and in India, a lot of financial institutions now circulate CSR bonds which allow companies to raise capital for sustainability projects which helps them to comply with CSR regulations.[179] CSR funds serve as an additional source of capital for R&D in clean technologies, sustainable agriculture and climate adaptation solutions. In addition, many multinational corporations in India collaborate with startups to develop eco-friendly supply chains and reduce carbon footprints which would expand green finance opportunities.

3.3.2: Policy frameworks on Environment Protection and Green Finance

National Action Plan on Climate Change (NAPCC)

With eight core missions mentioned earlier, the National Action Plan on Climate Change (NAPCC) acts as a comprehensive framework which addresses climate change challenges while promoting sustainable economic growth. Be it the National Mission for Enhanced Energy Efficiency (NMEEE) or the National Solar Mission, they serve as a framework that address climate change while keeping in account sustainable economic growth. The National Solar Panel provides incentives and subsidiaries for startups in solar energy production and technology development,

[177] The Companies Act, No. 18 of 2013, § 135, INDIA CODE.
[178] Section 135 of the Companies Act, 2013
[179] Ministry of Corp. Affs., CSR Rules (2021), https://www.mca.gov.in.

NMEEE facilitates mechanisms which are market centric such as the PAT scheme which deals with trading energy saving certificates.[180]

The Environmental Protection Act of 1986 first brought the NAPCC[181] which empowers the central government in taking measures for environmental protection. In addition to this, the Electricity Act, 2003 promotes renewable energy through mandatory Renewable Purchase Obligation which compels, procuring a certain percentage of powers from unrenewable sources. The NAPCC aligns with India's commitment under the Paris Agreement emphasizing the country's strategy to transition towards low-carbon growth. The Reserve Bank of India (RBI), through the priority sector lending process supports green financing which helps startups to work in renewable energy and energy efficient organizations to access credits. This convergence of policies and financial incentives makes NAPCC a significant enabler of green finance for startups.

Foreign Direct Investment (FDI) Policies in Renewable Energy

A crucial enabler of green finance primarily in the startup ecosystem in the country's renewable energy sector is Foreign Direct Investment (FDI). In matters of renewable energy industries, including solar, wind, biomass and hydropower, the government of India allows 100% FDI. The Department of Promotion of Industry and Internal Trade (DPIIT) through the consolidated FDI policy enhances capital accessibility for startups which are into green initiatives. Tax incentives and benefits for renewable energy especially for private sector investments are provided for green startups.[182] In addition to this, the Ministry of New and Renewable Energy (MNRE)'s financial institution, Renewable Energy Development Agency (IREDA) which brings soft loans and credit enhancement mechanisms to attract foreign investors in the green energy startup ecosystem of India.[183]

Initiatives such as the Green Energy Corridor project focus on integrating renewable energy sources into national grid and Production Linked Incentive (PLI) scheme for solar photovoltaic

[180] Ministry of Env't, Forest & Climate Change, National Action Plan on Climate Change (2008), https://moef.gov.in.
[181] National Action Plan on Climate Change
[182] Dep't for Promotion of Indus. & Internal Trade, Consolidated FDI Policy Circular (2023), https://dpiit.gov.in.
[183] United Nations Framework Convention on Climate Change, India's FDI & Renewable Energy Policy Alignment (2022), https://unfccc.int.

manufacturing which was launched in 2020 strengthens climate friendly incentives for domestic productions and supply chain development.[184] The Indian government has streamlined regulatory approvals and reduced the burden of foreign investors primarily in green energy space as per the United Nations Framework Convention on Climate Change (UNFCCC). Apart from enhancing financial inflows, these measures also enable technology transfers, capacity building and sustainable infrastructure development. With these frameworks in play, the startups in the renewable sector have a conducive environment to access international capital, scale operations and contribute to the green transition of India.

Sustainable Finance Initiatives by NITI Aayog

India's premier policy think tank, NITI Aayog has played an important role in advancing sustainable finance mechanisms to support green startups. Blended finance models, impact investments and green bonds are mechanisms that the organization has championed while driving environmental sustainability in the private sector.[185] The Atal Innovation Mission (AIM) fosters early-stage startups through incubation support, funding and mentorship with an emphasis on sustainability-driven initiatives. Government introduced tax incentives for investments across green infrastructure under the Finance Act of 2021 which aligns with the NITI Aayog's roadmap for sustainable development. The organization collaborates with agencies which include the World Bank and the International Finance Corporation (IFC) to design sustainable financing models which are tailored for startups. Opportunities in renewable energy, waste management and sustainable agriculture are identified by the SDG Investor Map for India which is launched in collaboration with the UNDP which guides financial institutions towards green startups.[186]

In the year 2022, NITI Aayog released the 'State of India's Environment Report'. Primarily dealing with the role of financial institutions in fostering green finance and green entrepreneurship, the Report recommends expanding the framework of green taxonomy which integrates climate risk into financial regulations and promotes the access of credit for environmentally responsible

[184] Ministry of New & Renewable Energy, Production Linked Incentive (PLI) Scheme for High-Efficiency Solar PV Modules, https://mnre.gov.in/en/production-linked-incentive-pli.
[185] NITI Aayog, *Annual Report 2022–2023*, https://www.niti.gov.in/sites/default/files/2023-02/Annual-Report-2022-2023-English_06022023_compressed.pdf
[186] NITI Aayog, Green and Sustainable Growth, https://www.niti.gov.in/sites/default/files/2024-11/green%20and%20sustainable%20growth.pdf.

businesses.[187] Initiatives such as the Aspirational Districts Programme encourage sustainable economic activities in regions that are underdeveloped in providing green startups with incentives in establishing operations in these areas. NITI Aayog, through its sustainable finance principles ensures the access to diverse funding sources, from venture capital to development finance. These efforts align with the broader climate goals of India and reinforce the role of financial markets in promoting a resilient, low carbon economy.

Green Credit Program under the National Resource Efficiency Policy (NREP)

The National Resource Efficiency Policy (NREP) proposed the Green Credit Program focuses on creating a mechanism which is market-driven and rewards environmentally sustainable business practices.[188] The ultimate reason behind the Ministry of Environment, Forest and Climate Change (MoEFCC) in 2019 is to promote resource efficiency, waste minimization and circular economy principles. The Green Credit Program[189] operates in a similar manner as the Kyoto Protocol and the Paris Agreement, i.e., through incentivizing businesses to reduce their environmental footprints. The program is aligned with the Environmental Protection Act of 1986 and the Extended Producer Responsibility (EPR) framework under the Plastic Waste Management Rules, 2016.

The NREP emphasizes financial incentives, tax benefits and reduced burdens of compliance for green startups. RBI is exploring the mechanism of green credit policies and the integration of it into the existing banking frameworks, startups which seem to have a positive outcome, to access low-interest loans or venture capital backed by environmental performance indicators. Through a structured mechanism for incentives, the Green Credit Program enhances the commitment of India as a country in achieving the Sustainable Development Goals (SDGs). Primary leverage lies with startups in sectors like waste recycling, sustainable manufacturing, and clean energy can leverage this program to secure funding while advancing environmentally responsible innovation.

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[187] *Supra, 2*

[188] Press Information Bureau, Govt. of India, Press Release, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1967476.

[189] Drishti IAS, Green Credit Program, Daily News Analysis, https://www.drishtiias.com/daily-updates/daily-news-analysis/green-credit-program-2.

National Adaptation Fund for Climate Change (NAFCC)

Launched by the Ministry of Environment, Forest and Climate Change (MoEFCC), the National Adaptation Fund for Climate Change (NAFCC) focuses on providing financial assistance for climate resilience in vulnerable sectors. Initiatives such as agriculture, water resources, forestry and biodiversity are primarily supported by this fund which helps businesses in adapting to the adverse effect of climate change.[190]

The NAFCC follows a project-based approach, where state governments propose adaptation projects which align with the NAPCC and SAPCCs. Through grants and fundings, these mechanisms tend to implement solutions which bring a positive outcome against climate change. Targeted and sector-specific adaptation strategies with a focus on innovation and sustainability. Significant opportunities on funding related aspects for startups on sustainable agriculture, water conservation, renewable energy and climate-resilient infrastructure for developing drought resistant crops, rainwater systems, energy efficient irrigation techniques and ecosystem restoration solutions. Apart from mitigating climate risk, these projects also align its goals to the United Nation Sustainable Development Goals. First recognition of a fiduciary duty to consider climate risk in investment decisions was done in the case of *McVeigh v. REST Super Fund*[191].

This fund aligns with the United Nations Framework Convention on Climate Change and Paris Agreement which reinforces the country's adaptation efforts. The blended finance models combine NAFCC with private-sector investments and green bonds to scale up climate adaptation initiatives. Through technological innovation and capacity building, NAFCC focuses on ensuring that both public and private sector stakeholders come together and contribute to a sustainable environment.

3.4: Conclusion

Significant shift has occurred in India’s green finance landscape which aligns domestic policies with the global commitments to sustainability. The integration of regulations, financial benefits and institutional mechanisms have led businesses and startups to be sustainable and become eco-

[190] National Bank for Agriculture & Rural Development (NABARD), Climate Change, https://www.nabard.org/content.aspx?id=585

[191] **Mark McVeigh v. Retail Employees Superannuation Pty Ltd**, Federal Court of Australia, No. NSD1333/2018

friendly and climate efficient. Initiatives such as NAPCC, Foreign Direct Investment on renewable energy, India has placed itself as a key player in the green finance landscape. In addition to these, RBI and SEBI have introduced frameworks which integrate climate risks into financial decision making. Not only India but countries like France have also highlighted the increasing use of corporate liability mechanisms to enforce sustainable finance practices.[192]

While these measures mark a step towards a sustainable economy, green finance is inherently global in scope. International legal framework and financial mechanisms including Paris Agreement, United Nations Sustainable Development Goals and institutions like World Bank and IMF are key stakeholders in shaping national policies. The country's green finance strategies are interlinked with the international commitments which fosters cross-border collaborations, technology transfer and foreign capital inflows. The next chapter deals with the international frameworks which govern green finance and assesses their impact on India's and the country's global environment landscape.

[192] **Oxfam France, Notre Affaire à Tous & Friends of the Earth France v. BNP Paribas**, Tribunal Judiciaire de Paris [Judicial Court of Paris], filed Feb. 23, 2023, under the French Duty of Vigilance Law (Loi de Vigilance)

CHAPTER 4

INTERNATIONAL INFLUENCE ON INDIA'S GREEN FINANCE REGULATIONS

"The shift to green finance is not a local movement, but a global necessity. We are all interconnected in the fight against climate change."[193]

4.1: India's Climate Commitments and International Treaties and frameworks on Climate change

4.1.1: Introduction

Green finance plays a vital role in combating climate change while maintaining economic stability. While various domestic laws focus on the implementation of green finance, green finance finds its roots from multilateral treaties, bi-lateral agreements, international laws and mechanisms of climate finance which were framed at a global level.[194] These international laws create obligations on nations, which are legally binding in nature, making the economic growth align with the environmental goals. International laws are significant in shaping the financial policies, promoting green investment and moving towards a low carbon economy. The very foundation of green finance can be traced back to multilateral treaties on climate change, environmental protection and economic sustainability. In addition to these treaties, principles such as the common but differentiated responsibility and the polluters pay principle play an influential role in determining the amount of responsibility a nation would have, depending on the history of the nations with respect to emissions of greenhouse gases.[195] Various international treaties through its emphasis on climate finance compels nations to utilize resources for sustainable projects. New obligations, like equitable finance distribution and accountability for financial flows have led industries, startups and countries to focus on global sustainability objectives and align the goals of the corporations accordingly.

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[193] **Christiana Figueres**, Former Executive Secretary of UNFCCC

[194] United Nations Environment Programme**, Green Financing,** https://www.unep.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-financing

[195] **M. Ahmed et al.,** *Green Finance and Green Bonds: Opportunities and Challenges in Emerging Markets*, Energy Pol'y, https://www.sciencedirect.com/science/article/pii/S0308597X20309647

The concept of green finance was formally addressed at the United Nations Framework Convention on Climate Change through focusing on the need for financial assistance to developing nations and thereby requiring global cooperation and commitment for combating a challenge like climate change. Five years later, based on the UNFCCC, the Kyoto Protocol was introduced. It brought a concept of different emission reduction targets for different nations. Later, in the year of 2015, with a broader vision of aligning environmental and economic goals, the Paris Agreement was signed by 195 countries aligning their vision towards sustainable development.[196] In addition to these climate focused treaties, the Addis Ababa Action Agenda (2015) and the Sustainable Development Goals emphasize that green finance can act as a critical tool in enhancing profitability while maintaining ecology. The case of *Carvalho v. European Parliament and Council*[197], challenged weak EU climate laws The 2019's EU Green Deal marks a profound impact through the introduction of EU taxonomy for sustainable finance[198] which specifically deals with sustainable economic activities. The two recent Conference of Parties, COP 28 (2023) in Dubai and COP 29 (2024) Baku, Azerbaijan redefined financial commitments and mechanisms for sustainable development.

4.1.2: United Nations Framework Convention on Climate Change and the foundation of India's green finance framework

The UNFCCC was one of the frameworks that were open for signature at the Rio Earth Summit at Brazil in the year 1992 and entered into force on 21st March, 1994. Apart from the core functions like setting limits on the emission of greenhouse gases, providing a framework for international cooperation, it also focused on building a financial mechanism which grants financial resources on a concessional basis through technology transfers and other mechanisms. It also had specifically mentioned in Article 11.5 of the convention that the developed countries who are a signatory to this convention, may provide the developing countries with financial resources as per the principle

[196] United Nations Framework Convention on Climate Change, ***The Paris Agreement***, https://unfccc.int/process-and-meetings/the-paris-agreement

[197] **Armando Carvalho and Others v. European Parliament and Council**, Case T-330/18, 2019 E.C.R. II-00000 (Gen. Ct. of the EU), aff'd, Case C-565/19 P (CJEU 2021).

[198] European Commission, ***EU Taxonomy for Sustainable Activities,*** https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

of "common but differentiated responsibility and respective capabilities.[199] The convention extended its framework to the formation of "Global Environment Facility"[200] which looks into the operations of the financial mechanisms.

India was a signatory to the UNFCCC on June 10, 1992 and ratified it on November 1, 1993.[201] In response to the UNFCCC, India took various steps as a part of its commitments while primarily focusing on the needs of the society. Established in the year 1985, the Ministry of Environment and Forests (MoEF) continued to be the body which coordinated the climate related activities in the country. In addition to the MoEF, the Indian Council of Forestry, Research and Education was established which focused on environmental conservation with broader climate related goals.

The first National Communication (NC1) was submitted in the year 2004 which dealt with India's greenhouse gas emissions, the impacts of climate change primarily on sectors like agriculture and water resources.[202] In addition to this, NC1 also described its responsive action and policies on climate change. India advocated on the principle of "common but differentiated responsibilities" and was of the view that the historical responsibility should be a factor for measurement of the emission reduction targets and the associated responsibility. Furthermore, India through the National Solar Energy Program of 1992 promoted solar energy and wind energy programs primarily in states like Tamil Nadu. While India was a signatory to the UNFCCC, India at the global negotiations advocated the concept that developing countries like India should not have such stringent targets as developing countries due to the difference in their historical emission of greenhouse gases. Although there had been no specific measures on implementing green finance, the actions of environmental and sustainable development laid the groundwork on green finance practices in the later years.

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[199] United Nations Framework Convention on Climate Change, ***United Nations Framework Convention on Climate Change***, https://unfccc.int/resource/docs/convkp/conveng.pdf (last visited Apr. 1, 2025).

[200] United Nations Framework Convention on Climate Change, **What Is the United Nations Framework Convention on Climate Change?, UNFCCC,** https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change**.**

[201] United Nations, ***Treaty on the Non-Proliferation of Nuclear Weapons***, Mar. 5, 1970, https://treaties.un.org/pages/ViewDetailsIII.aspx?src=TREATY&mtdsg_no=XXVII-7&chapter=27&Temp=mtdsg3&clang=_en

[202] India, ***India's Intended Nationally Determined Contribution: Working Towards Climate Justice***, U.N. Framework Convention on Climate Change (2015), https://unfccc.int/resource/docs/natc/indnc1.pdf (last visited Apr. 1, 2025).

4.1.3: Kyoto Protocol and India's Climate Landscape

Adopted in 1997 and enforced in 2005, the Kyoto Protocol, a treaty framed under the United Nations Framework Convention on Climate Change, had set legally binding targets for industrialized nations to reduce the emission of greenhouse gases. Although developing countries like India had no mandatory emission cuts, still they actively engaged in clean development mechanisms (CDM). Other benefits India had through the idea of kyoto protocol was the foundation of a dynamic green finance landscape which balanced economic growth with environmental sustainability, green finance and carbon market mechanisms. Amongst other countries, India was one of the countries which availed huge benefits on attracting financial investments such as projects like renewable energy and afforestation projects. By the year of 2012, India had over 1500 CDM projects second only to China.[203] CDM eased the technological inflows into India's green energy landscape. India's green energy sector enabling large scale solar winds and biomass projects. Through benefits from Certified Emission Reductions (CERs) which are sold in international carbon markets Indian industries participated in carbon trading.

4.1.4: Paris Agreement and the Key Development Post-Paris Agreement

At the 21st Conference of Parties in December 2015, the Paris Agreement was adopted as a part of the United Nations Framework Convention on Climate Change which later became a historical international accord on combating climate change and limiting global warming. 196 countries across the globe became a signatory to it. The main agenda of the agreement was to combat climate change through the reduction of greenhouse gases and ensure climate resilience and mobilizing financial support for developing countries. The Paris Agreement seeks to limit global temperature rise below 2° C above pre-industrial targets with an aspiration of 1.5° C. A Nationally Determined Contribution (NDC) is outlined in the climate commitment every five years and a Global Stocktale is done to assess collective progress. The developed countries have committed $100 billion annually for mobilizing and supporting climate action of the developing countries. [204]

[203] **Review: What Is the Status of Clean Development Mechanism (CDM) Projects?**, FACTLY (Apr. 29, 2022), https://factly.in/review-what-is-the-status-of-clean-development-mechanism-cdm-projects/.
[204] *Supra, 190*

4.1.5: Pre-Paris Climate Action

To address the growing threat of climate change, several international climate initiatives were brought into action. The Kyoto Protocol was the first legally binding climate treaty that mandated industrialized nations to reduce carbon emissions. Due to the limited scope of the Kyoto Protocol, apart from the major developing emitters like China and India - it could not achieve all of its objectives. The **Bali Roadmap of 2007**[205] and the **Copenhagen Accord of 2009** sought to bring emerging economies into climate negotiations but their non-binding nature led to fragmented progress. Although a lot of frameworks that were developed did not have the impact it wanted to bring on climate actions, Montreal Protocol on ozone depletion of 1987 successfully phased out chlorofluorocarbons and thus reduced greenhouse gas emissions indirectly. Voluntary Commitments like the REDD+ mechanism with respect to deforestation reduction which was one of the early climate financing strategies. These Pre-Paris frameworks established carbon markets, international cooperation mechanisms and financial instruments which paved the way for a more ambitious and a comprehensive Paris Agreement.

4.1.6: Post-Paris Agreement

Since the Adoption of the Paris Agreement, a lot of policies came into effect and transformed widely. The Addis Ababa Action Agenda of 2015[206] strengthened sustainable development financing which primarily focused on investments by private organizations and green bonds. Through setting a target of Carbon neutrality by 2050 and positioning Europe as a leader in climate action. The European Green Dean introduced the Carbon Border Adjustment mechanism. Climate Action, one of the 17 Sustainable Development Goals of the United Nations, aligns with the vision of the Paris Agreement, promoting sustainable energy, urban resilience and responsible consumption. The Glasgow Climate Pact, an agenda of the Conference of Parties (COP 26) accelerated commitments by encouraging a global phase down of coal, enhancing adaptation finance and setting targets for reduction of methane.[207]

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[205] United Nations Framework Convention on Climate Change, **The Bali Road Map**, UNFCCC, https://unfccc.int/process/conferences/the-big-picture/milestones/bali-road-map

[206] United Nations, *Addis Ababa Action Agenda*, https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=2051&menu=35

[207] Supra, 200

On a similar scale, the Equator Principle, (2020 Update) strengthened environmental risk management in financial institutions ensuring sustainability considerations in project financing. The G20 Sustainable Finance Roadmap (2021-2023) standardized climate disclosures and green investment taxonomies facilitating climate-aligned financial markets. At the Conference on Parties (COP 28) in 2023, world leaders made a landmark agreement to transition away from fossil fuels which would reinforce commitments under the Paris Agreement. COP 29 which was held at Baku, Azerbaijan further refined climate finance targets and loss and damage fund for nations which are vulnerable.[208] Climate tech startups are one of the major sectors which saw a significant rise after the Paris Agreement and developments that followed it. Carbon Capture companies like Climeworks, Electric mobility companies like Tesla, have thrived with the growth of policies encouraging clean tech investments. Concerns about alignment of public financial flows with climate goals, as mandated by Article 2(1)(c) of the Paris Agreement was raised in the UK Case, *"Friends of the Earth Ltd. v. Secretary of State for International Trade and UK Export Finance"*[209]

The growth of carbon credit marketplaces like climate trade and fintech driven ESG rating systems exemplifies the adaptation of the financial sector with respect to climate goals. A more integrated, financially viable and globally coordinated approach to climate action can be developed with businesses, startups, governments and civil societies working together and with an aligned goal of creating a sustainable ecosystem both in terms of economy and the environment.

4.2: Comparative Analysis of Green Finance Frameworks: India vs. European Union vs. China

One of the cornerstones of sustainable development is green financing. With the increase in shifts on climate-based challenges across the globe, the role of financial institutions and regulatory bodies across the world has been of a prime importance. Neither is environment country-specific, nor is the implication of industries and projects impacting climate change. Even if a country, miles away releases carbon, it affects countries beyond its geographical borders and even beyond to

[208] World Bank Group, IMF and OECD, **Activating Alignment: Applying the G20 Principles for Sustainable Finance Alignment with a Focus on Climate Change Mitigation** (2023), Washington, DC: World Bank.
[209] **Friends of the Earth Ltd. v. Secretary of State for International Trade and UK Export Finance**, [2021] EWHC 568 (Admin) (High Ct. of Justice, Queen's Bench Div., Admin. Ct., Mar. 16, 2021).

affect weather patterns of the country. Since, the environmental landscape is something that transcends global landscape, solutions must be global in scope.

Since the European Union has been a global benchmark with respect to sustainable finance and China shares almost similar developmental and environmental challenges and each one of them embody a unique approach, a comparison of these models would result in a spectrum of green finance strategies from state-driven to market-driven from developing to developed countries and from regulations to policy driven legal solutions.[210]

Apart from EU's action against state aid for coal brought up regulatory risks for financiers.[211] The European Union has one of the highly rationalized, regulatory driven approaches to green finance with strong ESG standards and public-private integrations.[212] Although China is a state-driven industry aligned green finance model, it faces issues with respect to flexibility in their financial models.

India currently sits as the crossroads - balancing climate ambitions, a dynamic startup ecosystem and an emerging green financing policy. India being a rapidly growing economy with a significant climate vulnerability, needs the industry to shift to greener models and since India currently has an ever-growing startup ecosystem, what better time than now.

4.2.1: Regulatory and Policy Frameworks for Green Finance

Attributes	**European Union**	**China**	**India**

[210] Supra, 141

[211] **Commission v. Republic of Poland**, Case C-121/19 P, Judgment of the Court (Fourth Chamber) of 28 November 2019, ECLI:EU:C:2019:1046.

[212] **Heinrich-Böll-Stiftung,** ***Sustainable Finance: Concepts and Practical Implementations*****,** https://il.boell.org/en/2024/03/09/sustainable-finance-explained-concepts-advantages-and-practical-implementations

Policy Framework	European Green Deal, Circular Economy Action Plan, Fit for 55 package **Germany:** Renewable Energy Sources Act, 2000 **Netherlands:** Netherland's Climate Agreement	China's 14th Five-Year Plan for Green Development	NAPCC, SEBI Green Bond Guidelines 2017, RBI's mandated climate related disclosures in alignment with TCFD.
Regulatory Authorities	European Commission, ECB, **Germany:** Federal Financial Supervisory Authority (BaFin)	NDRC, CSRC, PBoC	RBI, SEBI, Ministry of Finance, MNRE, TCFD
Climate Disclosure Mandates	CBAM, SFDR, CSRD, EU Taxonomy, EU Green Deal Investment Plan	People's Bank of China (PBoC) Guidelines	Business Responsibility and Sustainability Reporting (BRSR)

Carbon Pricing Measures	EU Emissions Trading Scheme (ETS), CBAM (Carbon Border Adjustment Mechanism)	National ETS (2021)	Voluntary and Pilot Stage

Table 4.1 shows the comparative analysis on Regulatory and Policy Frameworks for Green Finance.

European Union

The European Union's green finance ecosystem is led by the European Green Deal of 2019, approved in the year of 2020 with a greater vision of making the EU climate neutral by 2050.[213] The Carbon Border Adjustment Mechanism (CBAM) was brought as a result of the European Green Deal of 2019.[214] The broader plan includes, the potential carbon tariffs for countries which do not curtain their greenhouse gas pollution at the same rate. A fundamental component of the European Union's Green Deal and the Coronavirus Recovery plan under the Von Der Leyen Commission was the Circular Economy Action Plan introduced by the European Commission which mandates member states to transform their economies towards circular models. The plan included measures such as reviewing and updating climate-related policy instruments such as the emission trading system. Transitioning the focus from compliance to performance and then rewarding farmers for activities like carbon sequestration in soil and improved nutrient management. The plan also included reevaluating fossil fuel subsidies and exemption of taxations primarily in the shipping and aviation sector. Efficient and eco-friendly transportation systems

[213] **Diana Vela Almeida et al.,** The "Greening" of Empire: The European Green Deal as the EU First Agend**a,** 105 Political Geography 102925 (2023), https://www.sciencedirect.com/science/article/pii/S0962629823001038.
[214] **Carbon Border Adjustment Mechanism -** European Commission, https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en

through smart mobility strategies. Through effective afforestation, forest prevention and restoration across Europe. To stimulate national public and private investments through partnerships with industry and member states, the plan supports research and innovation through leveraging Horizon Europe. Since the 1990s, the European Union will have decreased by 31% by 2022. A reduction of 55% on emissions from 1990 levels by 2030 is almost equal to 40% reduction from 2019 levels.[215] Furthermore, the EU Taxonomy Regulations of 2020 focuses on an important market transparency tool, establishing a system which deals with sustainable economic activities based on rigorous scientific criteria. In addition, the sustainable finance disclosure regulations and the EU Green bond standard focus on achieving transparency, preventing greenwashing and bringing mandatory disclosures of ESG factors on both investment decisions and sustainable financial instruments. Specific laws in countries who are a part of the Union, in essence, Germany and Netherlands have their own legislations which specifically focus on those countries. Germany through laws like the Renewable Energy Sources Act (EEG), enacted in 2000, plays a vital role in Germany's renewable energy policy. In addition to that Netherland's climate agreement plays a huge role in the climate agenda specifically for a 49% reduction in GHG by 2030.[216] *Duarte Agostinho and Others v. Portugal* was the first transnational climate case before the ECHR could lead to binding rulings on state obligations to reduce emissions.[217]

China

Through a top-down state driven approach, China has emerged as a global leader in green finance. Through centralized regulation, strong alignment with national development plans and growing market-based mechanisms, there has been a growth in green financing in China. The People's Bank of China (PBoC) guidelines became the first country to issue green finance guidelines which outlined principles, goals and institutional mechanisms in order to develop green credits, green bonds and environmental risk management in financial institutions. The Green Bond Endorsed Project Catalogue incorporated carbon-neutral and renewable projects and excluded 'clean coal' and aligned it with international standards. Through pilot-climate stress testing for major banks to

[215] **Fit for 55 - Consilium**, https://www.consilium.europa.eu/en/policies/fit-for-55

[216] **Ministerie van Algemene Zaken,** ***Measures to Reduce Greenhouse Gas Emissions - Climate Change - Government.*****Nl** (2014), https://www.government.nl/topics/climate-change/national-measures (last visited Apr. 7, 2025).

[217] **Duarte Agostinho and Others v. Portugal and 32 Other States**, App. No. 39371/20, Eur. Ct. H.R. (pending).

assess environmental risks and exposure to carbon-intensive sectors, carbon accounting and risk management was initiated by People's Bank of China.

The National Development and Reform Commission (NDRC) focuses on the development of the national green bond market and broader economic planning related to sustainability. The 14th five-year plan (2021-2025) prioritizes green development through the incorporation of green finance as a policy tool on reducing carbon intensity, developing clean energy and are supportive to low-carbon industries.[218] The Green Industry Guidance Catalogue provides a detailed criteria for classifying projects eligible for green financing which includes pollution prevention, circular economy and energy efficiency. Although the ESG disclosure framework is not mandatory, there are disclosure requirements for listed companies. Apart from the ESG disclosure framework, China Securities Regulatory Commission (CSRC) has developed its own guidelines for issuance of green bonds under the exchange markets as an alternative to PBoC/NDRC approved bonds.[219] In the year 2021, China's national carbon market is the world's largest, which initially covered the power sector plans to expand to steel, cement and other industries.[220] Through issuance of green credits, commercialized banks are asked to issue credit for green projects. Across 9 provinces, pilot zones allow for experimentation with incentive models and green insurance and local policy innovations.[221]

India

To combine regulatory reforms, public-private partnerships and strategic alignment to the global climate goals, a mixed approach to green finance was considered. While it separates itself from China's top-down state driven approach as India's green finance ecosystem is guided by a blend of govt. Policy, financial regulations and market participation which aims to promote sustainable developments. With the active role of the country's central bank and identifying climate risks and

[218] State Council of the People's Republic of China, ***Report on the Implementation of the 2024 Plan for National Economic and Social Development and on the 2025 Draft Plan for National Economic and Social Development***, delivered at the Third Session of the 14th National People's Congress on March 11, 2025, https://english.www.gov.cn/news/202503/13/content_WS67d2d566c6d0868f4e8f0c85.html.

[219] **United Nations Environment Programme Finance Initiative**, *China Embarks on a Journey of ESG Disclosure: 2024 Progress and Focus for 2025*.

[220] *Ibid*

[221] Saptakee S., *China Revives Its Carbon Credit Market: Price Swings & Future Outlook*, Carbon Credits (2025), https://carboncredits.com/china-revives-its-carbon-credit-market-price-swings-future-outlook/

sustainable finance as one of the important pillars for an eco-friendly economic growth. The Reserve Bank of India is a part of the Network for Greening the Financial systems (NGFs) and later issued a discussion paper on climate risk and sustainable finance in 2022 focusing on disclosure norms, stress testing and green taxonomy. Later, in the year of 2023, RBI brought a mandated climate related disclosures for large regulated entities in line with the Task Force on Climate related Financial Disclosures (TCFD) recommendations. [222]

India's green bond market has grown substantially. SEBI's green bond market has grown substantially. SEBI's green bond guidelines of 2017 align with international standards as it defined green debt and outlined eligible categories. The Union Budget of 2023-2024 underscored green growth as a central pillar which included initiatives such as Green Credit Programme (PM - PRANAM) scheme which focuses on incentivizing alternative fertilizers and viability gap funding for battery energy storage systems.[223] With a 19744 Crore Indian Rupees National Green Hydrogen Mission aims to create India a hub for green hydrogen production and exports. The Ministry of Environment, Forest and Climate Change (MoEFCC) and Ministry of Finance jointly oversee national climate and green finance policies. The Climate Finance Unit within the Ministry of Finance facilitates international climate funding access and enhances engagement like the Green Climate Fund (GCF) and the International Solar Alliance (ISA). A sustainable development roadmap under the G20 sustainable Finance Working Group during 2023.[224]

SEBI's Business Responsibility and Sustainability Reporting (BRSR)[225] is mandated for the top 1000 listed companies, which strengthened ESG disclosures and encouraged sustainability integration. A lot of Indian corporates have issued green, sustainability-linked loans and transition bonds and enhanced private sector engagement in green financing. Although India does not have a unified green taxonomy, collaborations with NITI Aayog, the International Financial Services Centres Authority (IFSCA) and other stakeholders. Through initiatives such as Startup India,

[222] Graham Caswell, *Reserve Bank of India Joins NGFS*, Green Central Banking (2021), https://greencentralbanking.com/2021/05/04/reserve-bank-of-india-joins-ngfs/
[223] India's Sovereign Green Bonds: Steps for Building on a Successful Debut, Grantham Research Institute on Climate Change and the Environment, https://www.lse.ac.uk/granthaminstitute/news/indias-sovereign-green-bonds-steps-for-building-on-a-successful-debut/
[224] *Supra, 218*
[225] India's Business Responsibility and Sustainability Reporting (BRSR), **EcoVadis**, https://ecovadis.com/regulations/india-business-responsibility-and-sustainability-reporting-brsr/

SIDBI's green finance initiatives and partnership with international organizations, financial inclusion and innovations supporting startups and fintech in clean tech, climate resilience and ESG analysis.

4.2.2: Role of Green Finance Frameworks in the Startup Ecosystem

Attributes	European Union	China	India
Startup Ecosystem	ESG Software as a Solution Platforms, High technology driven Clean tech Applications, Circular Economy focused businesses	State backed Green Startups, Renewable Energy, Green Finance	Green Startups, Organic Farming, Carbon Credit Tracker, Renewable Energy
Incentives & Frameworks	Atal Innovation Mission, SIDBI Scheme and BIRAC	EU Startup Nations Standard, EIC Accelerator, Green Deal Innovation Fund	National Green Development Fund, Green Credit Guidelines
Public-Private Partnership	Both VC and public grant mechanisms like Carbon Border Adjustment Mechanism.	Government Aligned Models and VC funds	Growing Institutional Support (Both Public Grants and Private Fundings)
Focus	Hydrogen, Green Infrastructure, Smart Mobility and ESG Tech	Batteries, Low Carbon Manufacturing Units, Green Startups	Renewable Energy (Solar Panels), Carbon Credits, EVs and Waste to Energy

Table 4.2 shows the comparative analysis on Regulatory and Policy Frameworks for Green Finance.

European Union

Due to the comprehensive framework and robust mechanisms, the European Union has a highly coordinated and well-capitalized startup ecosystem. Through frameworks such as the Pan-European Green Finance Regulations and Innovation, these startups tend to emerge with stronger backing of capital allowing them to scale across the EU market. A structured framework for clean tech and ESG-driven startups to thrive has been possible due to the EU Startup Nations Standards, European Innovation Council (EIC) Accelerator and the Green Deal Innovation Fund.[226]

Through grants, public-private partnerships and through policies on procurement on the basis of eco-friendly projects, EU member states tend to encourage startups to focus on green projects. Larger regulatory frameworks such as the EU Taxonomy Regulation, Sustainable Financial Disclosures and the Circular Economy Action Plan which would ensure access to finance and regulatory clarity.[227] The startups that primarily operate on green projects are in advanced domains which includes green hydrogen, smart mobility, circular bio economy and buildings which are energy efficient. To scale across borders, intra EU mobility, knowledge transfers platform and digital single market policies. Social innovations and attaining the SDG is what the European Union focuses on.

China

With a top-down innovation model, the green startup ecosystem focuses on the state planning instruments such as the 14th Five Year Plan, the Green Industry Guidance Catalogue and the dual carbon goals. Provincial governments and special economic zones play a vital role in piloting carbon trading mechanisms, green insurance models and decarbonization tools.[228] State controlled banks and green finance Pilot zones provides access to loans and subsidies for green ventures -

[226] European Commission, Strasbourg, 6.7.2021, COM(2021) 390 final, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Strategy for Financing the Transition to a Sustainable Economy, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021DC0390

[227] Economy and Budget, Topics | European Parliament (2025), https://www.europarl.europa.eu/topics/en/topic/economy-and-budget

[228] Outline of the 14th Five-Year Plan (2021-2025) for National Economic and Social Development and Vision 2035 of the People's Republic of China, News, Fujian Provincial People's Government, https://www.fujian.gov.cn/english/news/202108/t20210809_5665713.htm

unlike the EU's decentralized entrepreneurial model, China's approach is more of a government-academic-industry consortia which leverages on streamlined regulatory approvals, subsidy mechanism and guaranteed offtake for clean technologies. However, due to the absence of a robust third party verification framework there's a lack of investor confidence and hence challenges persist.

India

India has seen a recent rise in the emergence of green startups primarily in sectors like waste management, renewable energy, ESG Compliance technologies and electric mobility. Several financial mechanisms, public grants like Atal Innovation Mission, Startup India and BIRAC and green financing programs under SIDBI tend to help these startups procure funding.[229] The Agri-tech and the Fintech sector is growing in India and are developing tools for carbon tracking, green supply chain audits and regenerative agriculture. Although their lies gaps on standardized green finance policies are inconsistent. ESG disclosures mandates and uneven access to long-term venture capital pose systemic challenges. India's demographic advantage and growing climate consciousness are a silver lining to the fact that India has immense potential for startups to scale both nationally and globally.

4.3 Policy Convergence and Divergence in Global Green Finance Regulations

With the increased effect of climate change, the world is considering a paradigm shift towards environmental sustainability and are increasingly deploying regulatory and financial instruments to promote eco-friendly investment. Although there is a movement towards harmonization with platforms like the G20 Sustainable Finance Working Group and the International Platforms on Sustainable Finance (IPSF), differences in policy, institutional capacity and political demography have led to divergence in the implementation.

4.3.1: Global Green Finance Regulations: Converging Goals, Diverging Tools

[229] Ministry of Commerce & Industry | Startups & Innovation Ecosystem Are Engines of Growth for Any Country, Press Release, PIB Delhi, Mar. 15, 2023, https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1907318

Through common taxonomies, increased transparency and through mandated disclosures and the proliferation of green bonds can only converge the green finance mechanisms and regulations globally. One of the most comprehensive classification systems for activities which are economically and environmentally sustainable is the EU's green taxonomy. Stringent technical criteria and a "do no significant harm" principle helps in preventing greenwashing.[230] Inspired by the EU principles on Green Taxonomies, countries like Canada, China and South Korea have developed their green finance laws which signals a degree of normative convergence. The Task Force on Climate-related Financial Disclosures (TCFD) has become a de-facto standard for corporate - environmental disclosures which are also endorsed by regulators of the United Kingdom, Japan, New Zealand and Singapore.[231] In addition to this, the International Capital Market Associations (IVMA)'s green bond principle is one of the guidelines that has been adopted widely to help issuers and investor's structure green bonds.[232]

Although there are models that have been adopted across borders, significant divergence remains. The inclusion of nuclear energy and natural gas by the European Union under certain criteria on the basis of sustainability were opposed by other countries like Germany and Austria.[233] One of the historic inclusion in China's taxonomy 'clean coal' technologies which brought in certain criteria from international observers although there has been a recent shift to a more internationally aligned system.[234] In addition to the above, Carbon pricing mechanisms vary across jurisdiction ranging from EU's emission trading system (EU ETS) to carbon tax regimes in countries like Sweden and Canada whereas many countries still lack such instruments altogether.[235]

World's third largest emitter of carbon, India faces the complex challenge of balancing both the rapid growth of industry and economy with environmental sustainability. Fragmented policies and institutional constraints have grappled with the growth of the country's green finance landscape. In the Global South, SEBI was one of the first regulators to issue guidelines on green bonds in 2017 which aligned broadly with the ICMA green bond principles. A foundational regulatory

[230] Regulation (EU) 2020/852 of the European Parliament and of the Council, 2020 O.J. (L 198) 13.
[231] Task Force on Climate-related Financial Disclosures, Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures (June 2017), https://www.fsb-tcfd.org/.
[232] Int'l Cap. Mkt. Ass'n, Green Bond Principles (2021), https://www.icmagroup.org/.
[233] Eur. Comm'n, EU Taxonomy Climate Delegated Act (2022), https://ec.europa.eu.
[234] People's Bank of China, Green Bond Endorsed Project Catalogue (2021 Edition).
[235] World Bank, Carbon Pricing Dashboard, https://carbonpricingdashboard.worldbank.org/

framework to raise capital for clean and green projects is what the guidelines primarily focus on. The first sovereign green bond was issued by India which raised approximately 16000 Crores (USD 2 Billion). The Indian Startup ecosystem is ranked third globally in terms of the number of startups aligned to sustainability goals. In sectors such as solar energy, electric mobility, sustainable agriculture and carbon accounting are at a rapid growth. These startups play a vital role in solving the environmental concerns of the country and the globe. Due to the lack of a significant green finance regulatory framework, there stands a significant obstacle to the growth of these startups and hence their mission remains constrained.

Since most of the financial instruments such as green bonds are limited for startups and are designed for large credit rated entities.[236] Although funds like Startup India Seed Fund or SIDBI Funds of Fund, they do not cater directly to green startups. Furthermore, funding constraints are exacerbated due to the absence of specialized green venture capital or blended financial models.[237] On the other hand, European Investment Bank and Institutions like the Green Climate Fund have created targeted windows for climate investments which can be replicated by India to have a proper funding channel for green startups.[238] In addition to these, India also lacks a standardized green taxonomy which is applicable to startups and they lead to confusion and inconsistencies in defining what constitutes an 'eco-friendly' enterprise which further undermines the confidence of the investor and limits cross-border investment opportunities. A green taxonomy applicable to startups will lead to a system that is eco-friendly. An absence of such a framework has led to undermining investor confidence and a limited cross-border investor opportunity. In addition to this, the Indian framework lacks an integrated ESG framework tailored for SMEs which has limited their ability to measure sustainability performance in the capital market.[239] A coordinated and an inclusive approach is what India requires in order to enhance convergence with the global green finance framework. Finalizing a comprehensive green taxonomy which includes guidance for startups and SMEs would be imperative. A framework tailored to India's developmental need but shaped from world's best green finance frameworks such as EU Green Taxonomy and IPSF Green Taxonomy and creating funding mechanisms through public-private partnership would bring up a national

[236] Council on Energy, Environment and Water (CEEW), *Mapping India's Climate Finance*, (2021), https://www.ceew.in.
[237] NITI Aayog & Rocky Mountain Institute, *India's Green Startup Ecosystem: Policy Needs and Gaps* (2022).
[238] Green Climate Fund, *Private Sector Facility* (2023), https://www.greenclimate.fund.
[239] IFC, *SME ESG Reporting and Benchmarking Toolkit* (2021).

framework for green finance which would help the Indian startups to focus on green projects and receive funding for their green project and thereby promote environmental sustainability at a large. The Case of *"K.B. Nagur v. Union of India"*[240] reinforced judicial expectations that public and private financing must align with broader public interest, including environmental welfare.

4.4: Implications of Global Best Practices on India's Sustainable Finance Policy

To build a profound impact on the financial system's regulatory frameworks and environmental commitments, an integration of the global best practices into sustainable finance policy is the need of the hour. With the alignment of international frameworks, India not only enhances its credibility in global markets but also strengthens the domestic approach to sustainability. Through mandatory ESG disclosure framework, national taxonomy for green finance, creation of a green bond verification authority and integrating climate risk into financial supervision, global practices that are best suited to create a sustainable ecosystem needs to be implemented in the Indian green finance framework.

4.4.1: Mandatory ESG Framework

In countries across the globe, ESG frameworks are becoming an integral part iof sustainable finance. The European Union's Sustainable Finance Disclosure Regulations (SDFR) mandates financial market participants to disclose their ESG risks and operations. The United States' Securities and Exchange Commission is moving towards a mandated climate disclosure to bring clarity and consistency in the ESG framework.

While SEBI's Business Responsibility and Sustainability Reporting (BRSR) mandates ESG disclosures from the top 1000 listed companies, a lack of uniformity remains across various sectors primarily within the startup ecosystem. A development of a centralized ESG disclosure regulations above a certain threshold based on turnover, a framework similar to income tax. Furthermore, a creation of a digital repository of ESG reports could help investors and issuers to mandate the framework and promote green projects.

[240] **K.B. Nagur v. Union of India**, (2012) 4 SCC 483

4.4.2: National Taxonomy for Green Finance

The European Green Taxonomy and China's Green Bond Endorsed Project Catalogue[241] have classified activities as green, transitional and brown, helping investors to align capitals to green projects. Due to lack of a standardized framework, the efforts to create a sustainable ecosystem remain fragmented. A primary focus should be to draw a nationally approved Indian Green Taxonomy aligned with the climate commitments under the Paris Agreement. With collaborations from SEBI, RBI and NITI Aayog, the ministry of finance can develop a taxonomy which would maintain global standards and facilitate transparency while boosting the confidence of the investor.

4.4.3: Creation of a Green Bond Verification Authority

Guided by the International Capital Market Association's (ICMA) green bond principles and climate bonds initiative.[242] Green bonds are issued in the market with a prior third-party verification in order to authenticate the instrument's environmental benefits. Due to weak regulatory clarity and institutional mechanisms, the establishment of a National Green Finance Verification Board (NGFVB) under the RBI or International Financial Services Centres Authority is recommended for the issuance of green bonds. The establishment of the board will focus on certifying green debt instruments, validating use of proceeds and ensuring compliance with domestic and international standards.

4.4.4: Integration of Climate Risk into Financial Supervision

Notable steps to integrate the idea of sustainable finance including climate stress tests, scenario analysis and disclosure mandates are taken by the Bank of England, European Central Bank (ECB) and the Network for Greening the Financial Systems. Through a phased adoption, the Reserve Bank of India can systematically integrate climate risk into financial supervision, both banking and insurance. A mandated disclosure by banks and other financial institutions to disclose their exposure to high-carbon sectors and analyze the risk associated with it. The Task Force on Climate-

[241] **The Green Bond Endorsed Project Catalogue** 2021 Edition, Climate Bonds Initiative (2015), https://www.climatebonds.net/market/country/china/green-bond-endorsed-project-catalogue (last visited Apr. 8, 2025).
[242] The International Capital Market Association (ICMA), https://www.icmagroup.org/

related Financial Disclosures (TCFD) should prioritize the integration of climate related financial disclosures. In addition to the above measures, training programs would be essential for bank supervisors and other employees to build internal capacity.[243]

4.4.5: Establishment of a Blended Finance Platform

Considering the global initiative to de-risk green investment in the current emerging market from institutions such as green climate fund (GCF), the UK's Mobilist initiative[244] and the convergence platform demonstrated how public capital can catalyze private sector investment. Due to a high risk in the clean energy sector, although they present a huge amount of potential, financing gaps exist. An establishment of a National Green Investment Platform (NGIP) to coordinate blended financial incentives involving sovereign wealth funds MDBs (ADB, World Bank) and domestic institutional investors such as (LIC, EPFO). A dedicated unit under the Ministry of Finance could oversee the platform and harmonize funding schemes.

4.4.6: Green Credit Mechanism for SMEs and Startups

In European Countries, like Germany, Green credit lines are offered to SMEs who are transitioning their business to a sustainable practice by KfW Bank, The Green Recovery Challenge fund[245], funds startups who are planning to develop products or services which are climate resilient. In the Indian market, capital stands as a barrier when green startups are taken into consideration. Creation of a green MSME[246] Credit Guarantee scheme under SIDBI would reduce the risk of a lender and encourage innovation. Furthermore, a platform like Startup India could incubate a green startup sandbox which supports initiatives in climate tech, ESG fintech and circular economy solutions. Tax incentives for green research and development and a dedicated green venture capital fund should be explored to foster entrepreneurship in the green sector. Access to funding in early-stage startups is tough. A lot of startups are working on energy efficiency, renewable energy, waste

[243] Task Force on Climate-Related Financial Disclosures (TCFD), Task Force on Climate-Related Financial Disclosures, https://www.fsb-tcfd.org/
[244] Mobilising Capital to Meet the Global Goals, Mobilist, https://www.mobilistglobal.com/ (last visited Apr. 8, 2025).
[245] OECD SME and Entrepreneurship Papers No. 35, Financing SMEs for Sustainability: Drivers, Constraints and Policies, OECD, https://dx.doi.org/10.1787/a5e94d92-en.
[246] Micro, Small and Medium Enterprise

management and other technologies. Acceleration, incubators and funding specially for green initiatives and startups tackling environment and social challenges.

4.4.7: Mandatory Sustainability Integration in Public Procurement

EU and South Korea through public procurement incorporates environmental criteria to drive demand for sustainable goods and services promoting green supply chains and incentives compliance among vendors. Through amendment of the General Financial Rules (GFR) to include sustainability criteria for projects above a certain value of threshold. Vendors with certifications like the ECO mark or ISO 14001 should receive rewards due to their public procurement. A Green Preferred Vendor (GPV) system could be introduced wherein vendors with high ESG are prioritized in the bidding process. [247]

4.4.8: ESG Rating Regulation and Standardization

ESG trackers and auditors face huge scrutiny due to the inconsistent methodology and the lack of transparency in their system. Oversight mechanisms are introduced by bodies like the European Securities Market Authority (ESMA) and U.K's Financial Conduct Authority (FCA).[248] A consultation paper by SEBI with respect to ESG rating which mandates only the top 1000 listed companies dilutes the reason for disclosures. An enforceable guideline mandating registrations, methodology disclosures and conflict of interest mitigation. Through formulation of an oversight committee formed by RBI and SEBI, performance of ESG is to be audited and mandated the same through penalties and deregulations.

4.4.9: Carbon Market Integration with Global Mechanisms

The EU emission trading scheme (EU ETS) and China's national carbon market have demonstrated the role of carbon pricing in reducing emission. Article 6 of the Paris Agreement[249]

[247] The Energy and Resources Institute, Green Public Procurement for Advancing Sustainable Development in India: Policy Nudges for Promoting Sustainable Consumption and Production, SDG Charter, Act4Earth and World Sustainable Development Summit (2024), ISBN: 978-93-94657-27-4.

[248] European Parliament, **Texts Adopted - Transparency and Integrity of Environmental, Social and Governance (ESG) Rating Activities**, (Apr. 24, 2024), https://www.europarl.europa.eu/, .

[249] Article 6 of the Paris Agreement states that "Parties shall, where engaging on a voluntary basis in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards nationally determined contributions, promote sustainable development and ensure environmental integrity and transparency, including in

provides a legal framework for bi-lateral or multilateral carbon credit trading. The foundation of the Indian carbon market has been led by India's Energy Conservation (Amendment) Act of 2022. However, in order to attract foreign investors, the market needs to be aligned with the vision. With a clear verification protocol, transparent registries and price discovery mechanism, the carbon market should run in its operation. The Bureau of Energy Efficiency could be the nodal agency and to monetize surplus carbon credits, bilateral agreement under Article 6.2[250] could be explored with partners like the EU, Japan and Canada.

4.4.10: Sustainable Finance Education and Capacity Building

Supporting and imparting knowledge through various institutions like the National Institute of Financial Management (NIFM), Indian Institute of Corporate Affairs (IICA), and Indian Institutes of Management (IIMs). With the help of various certificate programs and mandatory ESG training in financial institutions with ideas drawn from EU's Sustainable Finance Education and Training Platform (SFETP) and Canada's Sustainable Finance Action Council (SFAC) which train professionals and individuals on ESG disclosures and green financing.

4.5: Conclusion

In conclusion, Chapter IV highlights the impact of international treaties and global frameworks on shaping the green finance landscape of India. The chapter focuses on the evolution of India's sustainable finance policies from the initial steps taken under the United Nations Framework Convention on Climate Change to more comprehensive agreements such as the Kyoto Protocol and the Paris Agreement. Apart from setting legally binding obligations for reduction of emission to fostering the development of critical financial mechanisms which facilitate technology transfer and green investments. Early engagement with these multilateral treaties laid the foundation of a regulated framework which seeks to balance economic growth with environmental sustainability.

This analysis also determines the international best practices exemplified by the European Union Green Deal and sustainable finance disclosures standard and the evolving carbon market

governance, and shall apply robust accounting to ensure, inter alia, the avoidance of double counting, consistent with guidance adopted by the Conference of the Parties serving as the meeting of the Parties to this Agreement."

[250] Article 6.2 of the Paris Agreement.

mechanisms played a crucial role in the regulatory landscape of India. A comparative analysis between EU, China and India reveal a spectrum of approaches starting from highly state-driven models to those characterized by public-private partnerships and market driven innovations. Moreover, the chapter identifies both convergence and divergence in policy frameworks at a global scale. At the same time, the distinct national contexts remind us that a one-size fits all approach is challenging to implement. Through a thematic literature review, the study found that to comply with the international obligations and resonate with the local economic and social conditions, remains a critical issue for India. Overall, the international influence on the green finance landscape of India has set the stage for further regulatory innovation. A resilient, inclusive and a sustainable financial landscape is what India strives for, since only that can support the nation's ambitious climate and economic goals.

CHAPTER 5

CHALLENGES & GAPS IN INDIA'S GREEN FINANCE LANDSCAPE

"The path to a sustainable future is fraught with challenges, but every challenge is an opportunity to redefine the rules of finance."[251]

5.1: The Role of the Banking Sector in Financing Green Startups: Opportunities and Barriers

One of the fastest growing economies, India stands at the cusp of a paradigm shift towards sustainable development. Commercial banks continue to play a vital role in this transition in financing green projects and innovations in green startups. The Reserve Bank of India, in its report on "Sustainable Finance in India" focused on the importance of green finance and worked on encouraging the financial institutions to focus on climate risk and sustainability into their operations. The case of *"M.C. Mehta v. Union of India (Vehicular Pollution Case)"*[252] led to directives for cleaner fuel usage and CNG[253] transition in public transport. The resultant infrastructural shift pushed banks and financial institutions to develop special lending schemes for green mobility and cleaner technologies.

A lot of Banks including the State Bank of India, YES Bank, HDFC Bank, ICICI Bank have taken notable steps in introducing green finance instruments focused on clean energy, energy efficiency and environmentally sustainable projects. For instance, SBI launched the SBI green fund so that it can invest in wind and ventures on solar. YES Bank was one of the early adopters of green banking principles and issued the country's first green infrastructure bonds in 2015 which is worth INR 1000 Crores.[254] Similarly the IREDA, a government owned financial institution, provides project specific financing in order to support startups in the renewable energy sector.

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[251] **Paul Polman**, Former CEO of Unilever

[252] **M.C. Mehta v. Union of India (Vehicular Pollution Case)**, (2002) 4 SCC 356

[253] Compressed Natural Gas

[254] Climate Bonds Initiative, **YES BANK Receives Green Bond Pioneer Award**, Climate Bonds Initiative (Feb. 24, 2017), https://www.climatebonds.net/resources/press-releases/yesbank-receives-greenbondpioneeraward-24feb-2017.

5.1.1: State Bank of India: Pioneering Public Sector Green Finance

In the year of 2018, State Bank of India raised USD 650 M through its first green bond issuance listed on Luxembourg Green Exchange. SBI is also a part of the Green Bond Principle (GBP), set by the International Capital Market Association. SBI also aligns with climate bonds initiatives.[255] Apart from these mechanisms, SBI has developed an internal framework for assessing green project viability and ESG compliance which contribute to renewable energy and solar projects across India. The initiatives by SBI focus on large-scale projects rather than startups which makes it difficult for startups or early age ventures to receive benefits of these initiatives.

5.1.2: ICICI Bank: Green Financing with a Private Sector Edge

With commendable strides in integrating environmental sustainability into the corporate lending practice, ICICI Bank was one of the first Indian Institutions to issue green bonds (USD 75 M in 2017) and disburses funds into renewable energy, water treatment and sustainable urban transport projects. In 2020, ICICI Bank launched its first green bond worth Rs 3,000 crore, aimed at financing renewable energy projects and energy efficiency initiatives.[256] Through the "Startup Assist Programme", ICICI Bank supports MSMEs and startups in projects like clean-tech and offers credit lines and mentorship. With a mission to implement climate-smart financing, ICICI bank has also partnered with the International Finance Corporation. However, since the ventures are non-bankable due to unproven models or lack of collateral, they lack the belief of the investors.

5.1.3: YES Bank: Early Leader in Green Bonds and Sustainability

A historic frontrunner in green finance among other banks, YES Bank issued its first green bond in the year 2015, raising INR 1000 crores to support renewable energy projects. YES Bank has financed over 2.3 GW of clean energy projects and pledged to mobilize INR 5000 Crores for green infrastructure. Apart from its investment, YES Bank also engages actively on green startups, primarily through the YES Scale platform which connects startups in clean tech, agri-tech and

[255] Climate Bonds Initiative, **SBI Makes USD650 Million Certified Splash in Green Bond Pool: Inaugural Green Issuance Cements SBI's Leadership in Sustainable Finance**, Climate Bonds Initiative (Oct. 4, 2018)
[256] ICICI Bank launches 'iStartup2.0' programme for start-ups. ***ET BFSI***, https://bfsi.economictimes.indiatimes.com/news/banking/icici-bank-launches-istartup2-0-programme-for-start-ups/78040412

mobility with corporate and investor networks. Through initiatives such as YES Environment Sustainability Accelerator, the bank has supported startups working in solid waste management and clean air technologies. Despite this, due to internal restructuring there has been a limited scalability of green funds.

5.1.4: HDFC Bank: Focus on ESG and Green Retail Finance

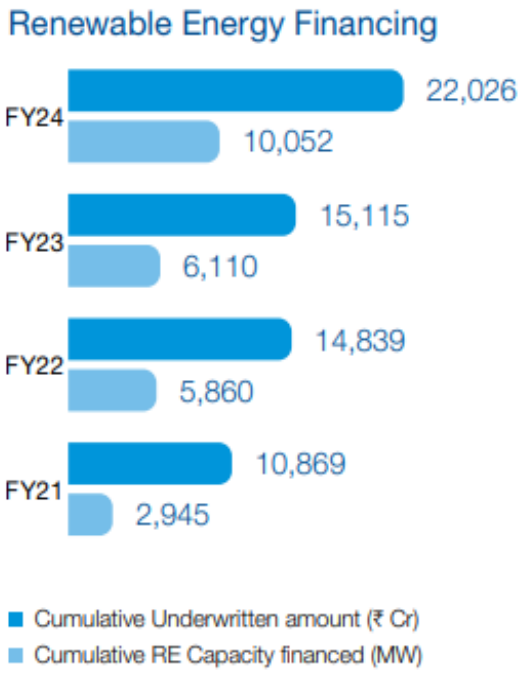

Fig 5.2 describes the Cumulative Underwritten amount in Crores and the Cumulative RE Capacity financed in MW by HDFC Bank[257]

One of India's largest private sector lenders, HDFC is focusing on ESG integration in its lending projects. It has financed green building, energy efficient appliances and solar energy projects. It also signed the UN Principles for Responsible Banking demonstrating its intent to align with sustainability goals. However, the bank's limited risk appetite for early-stage funding and the need

[257] HDFC Bank Ltd., *Integrated Annual Report 2023–24*, HDFC Bank (July 2024), https://www.hdfcbank.com/content/bbp/repositories/723fb80a-2dde-42a3-9793-7ae1be57c87f/?path=/Footer/About%20Us/Investor%20Relation/annual%20reports/pdf/2024/july/HDFC-Bank-IAR-FY24.pdf.

for more sector-specific due diligence teams are barriers that startups and SMEs face in receiving benefits of these lending projects or funds.

5.1.5: Axis Bank: Blending Innovation with Responsible Financing

Axis Bank has reaffirmed its dedication to advancing India's climate objectives by pledging incremental financing of ₹60,000 crore (around $7.2 billion) in ESG-aligned sectors by 2030, starting from August 2021. By March 2024, the bank had already disbursed ₹30,000 crore (approximately $3.1 billion) toward this goal.[258] Since, the International Finance Corporation and Global Environment Facility is in partnership with the Axis Bank, it has been a part of various energy efficiency financial initiatives targeting smaller firms and innovations. For startups, Axis Bank offers structured products and working capital support, although the lack of clarity, eligibility and due diligence are concerns that act as a barrier in offering such initiatives.

Challenges such as lack of credit guarantees, absence of a green rating framework, financial literacy and the lack of accelerators or incubators in this segment has led to low financial investments in green startups.

5.2: Absence of Codified Green Finance Legislation in India in the Indian Startup Ecosystem

One of the transformative forces for the national economy, which can reshape sectors including finance, healthcare, education and environment are startups. Startups by their very nature are - agile, disruptive and solution oriented which makes them fit to pave a way through the complex economic structure and its development with respect to environmental and social challenges. Since startups often tend to work on lean structures, quick decision making and an iterative problem-solving approach, it is easier for them to pivot and adapt to the emerging market trends. This flexibility helps them to experiment with sustainable technologies, adopt low-carbon models and integrate sustainability models into their business. Given India's commitment to reach ambitious

[258] **International Finance Corporation**, *IFC Partners with Axis Bank to Provide a $500 Million Climate Loan in India* (Mar. 7, 2024), https://www.ifc.org/en/pressroom/2024/ifc-partners-with-axis-bank-to-provide-a-500-million-climate-loan-in-india.

climate targets under the Paris Agreement and its Non-Determined Contributions, innovations and sustainability are the only ways through which the targets can be achieved.

2024 was a year of record-breaking startup growth across the country. According to data by the Ministry of Commerce and Industry, the Department for Promotion of Industry and Internal Trade (DPIIT) has issued over 1.57 lakh certificates for recognition of startups as of December 2024. With over 51% of the startups coming out of Tier II and III cities and cities like Hyderabad, Mumbai, Bengaluru, Kolkata and Delhi playing a huge role in promoting the startup ecosystem in the country.[259]

India is now the third largest startup ecosystem across the globe. With this exponential growth in the number of startups, green finance has gained momentum and is set to play a pivotal role in creating a disruption on how investments traditionally took place on the basis of profits and economic growth. For developing economies like India, green finance is essential to attain both its climate objectives and economic goals. While the startup ecosystem and green investments can thrive independently, their convergence can accelerate sustainable innovation.

The **RBI Guidelines on Climate Risk and Sustainable Finance (2023)** provides ways to banks and financial institutions to evaluate climate risks and then integrate practices which are sustainable in nature. Since these guidelines are advisory in nature, statutory obligations or actions cannot be addressed.

Since **SEBI's Green Bond Guidelines (2017)** only cater to listed companies on the issuance of green bonds. Under specific categories, these guidelines lack rigorous enforcement mechanisms. The 8 missions under the **National Action Plan on Climate Change (NAPCC)** does not integrate financial structures which limits its practical implementation by startups. The **SEBI-mandated Business Responsibility and Sustainability Report (BRSR)** only applies to top 1000 listed companies, thus has no implementation on startups or SMEs.

[259] Ministry of Commerce & Industry, India's Startup Revolution by PIB Delhi https://pib.gov.in/PressReleasePage.aspx?PRID=2098452

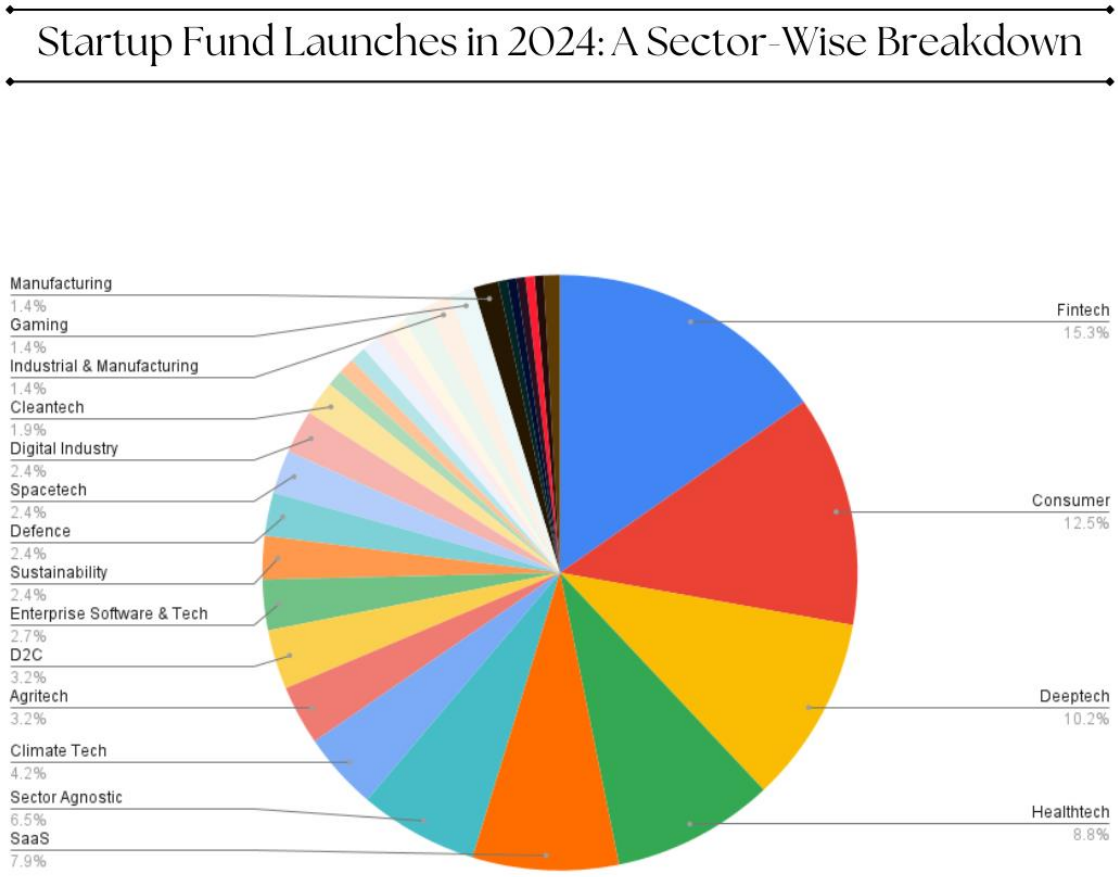

Fig 5.1 shows the startup funds announced for Indian startups in the year of 2024. (Data As of 16.12.2024)[260]

Over $8.7 Bn of funds have been attached to the Indian startup ecosystem out of which only 2.4% of the investment goes on sustainability-based initiatives, 1.9% on clean tech and 4.3% on climate tech startups. While there has been an increase in investment on environmentally sustainable startups, funding constraints, regulatory fragmentation and institutional uncertainties have discouraged startups from exploring the option of green finance. This highlights the requirement

[260] Lokesh Choudhary, *Indian Startups In 2024: 16 Charts That Sum Up The Past Year*, INC42 MEDIA (Jan. 6, 2025), https://inc42.com/features/indian-startups-ecosystem-2024-review-charts-visuals/ (last visited Apr 10, 2025).

of a codified regulation which clearly defines the scope, standards and incentives of green finance. In addition to enhancing certainty, legal frameworks help in building investor confidence without a well-structured regulatory framework, green finance risks are being perceived as fragmented and inaccessible, primarily for new age ventures and startups. To mainstream green finance in the Indian startup ecosystem and ensure the alignment of both environment and economic goal, introducing a uniform and binding legislative framework is essential.

India, despite increasing the focus to green investments, lacks a single codified law that deals with green finance which defines it, sets qualification benchmarks or deals with investor confidence. Although, there are several frameworks that operate, although indirectly to support green finance such as RBI's Guidelines on Climate Risk and Sustainable Finance (2023), SEBI's Green Bond Guidelines, National Action Plan on Climate Change (NAPCC), SEBI's BRSR Framework, a lack of a codified green finance law and a lack of tailored provisions for startups undermine the ability of startups to access green finance or to integrate environmentally sustainable project in their business models.

5.3: Institutional and Regulatory Barriers in Promoting Green Finance

The growth of sustainable financing is impeded by various institutional, regulatory and market barriers which have led to the slow pace of green finance in India. Due to the absence of a standardized regulatory framework, limited awareness and a very limited market liquidity for green financial products and issues on data availability and transparency. Since in countries like India and other developing countries the financial ecosystem is not at the mature state and hence the access to capital is tough.

In addition to policy makers and financial institutions, civil societies and investors seeking to contribute to climate change, need to understand the barriers with respect to green finance. The unavailability of regulatory and institutional compliances results in a very less supply of green investments. A limited awareness and expertise among stakeholders have been a reason for slowing down the conversion of green finance as a traditional method of finance. In addition to the policymakers and financial institutions, civil societies and investors seek to contribute to climate change.

5.3.1: Institutional barriers in promoting Green Finance

Limited Expertise and Awareness: A lack of necessary expertise to assess and manage green investments effectively in financial institutions is what acts as a barrier, which is worsened by the shortage of skilled professionals and hampers the development and implementation of green finance strategies. The *"Sterlite Copper Case*[261]*"* involved the closure of a copper plant for environmental violations, highlighting the financial risk and market instability faced by investors when corporations disregard environmental norms. This case illustrates how market barriers, such as potential corporate shutdowns due to non-compliance, deter investors from funding green projects.

Short-term Investment Focus: A lot of financial institutions prioritize short-term returns, which conflict with the long-term nature of green investments. Since green projects such as renewable energy, take time and may take years to be profitable, short-term funding discourages their plans.

Challenges with respect to coordination between financial and environmental policies: In a country like India connecting and coordinating between financial regulations and environmental policies is a daunting task and due to this huge challenge, inefficiencies arise when promoting green finance. To create a sustainable ecosystem and a supportive ecosystem for sustainable investment and an alignment between these policies are of prime importance.

A limited pipeline of bankable green projects: Due to the shortage of well-prepared, bankable green projects, financial institutions limit their opportunities for investing in green financing. Inadequate infrastructure for pollution control, especially CETPs (Common Effluent Treatment Plants), making eco-compliance costly for startups and unviable for financiers in smaller towns or emerging sectors.[262]

High risk perception of green investment: Since green projects or green finance is primarily a newer concept, and due to the lack of financial loans, investors find green investment as a very new and risky concept.

[261] **Sterlite Copper Case (Vedanta)**, NGT (2018)
[262] **Paryavaran Suraksha Samiti v. Union of India**, (2017) 5 SCC 326

5.3.2: Regulatory barriers in promoting Green Finance

Lack of Standardized Definitions and Taxonomies: As discussed earlier under Chapter 5.1, since there is an absence of universally accepted definitions for what is 'green finance', there is a huge inconsistency in identifying and classifying sustainable investments. This creates complexities and comparison of the impact of the environment for financial institutions which operate at international levels. The court in the case of *"National Green Tribunal Bar Association v. Ministry of Environment & Forests"*[263] emphasized the absence of climate-related financial risk assessment in large-scale project financing. This legal vacuum makes it risky for financial institutions and startups involved in climate innovation to secure capital with certainty.

Fragmented Regulatory Frameworks: A lot of regulations across jurisdiction creates an environment which is complex for international cross-border investment. Due to high compliance cost and administrative burden, cross-border green investment was deterred. The case of "*Sterlite Industries (India) Ltd. v. Union of India*"[264], demonstrates how environmental approval delays and litigation can create a hostile environment for investors in green ventures, especially in sectors like energy and infrastructure where regulatory hurdles impede financial inflow.

Insufficient Data and Reporting Requirement: The availability of data related to green finance is a huge challenge with respect to green finance. A lack of comprehensive activities and reliable data on environmental impact of such activities have acted as a barrier in effectively monitoring and assessing the performance of financial institutions in promoting green finance. The landmark case of *"T.N. Godavarman Thirumulpad v. Union of India"*[265] exposed systemic flaws in forest governance and regulatory gaps in environmental clearances, which continue to create uncertainties for green projects seeking funding, especially in forestry and renewable energy sectors.

Policy Uncertainty and Inconsistent Incentives: Due to the absence of long-term incentives, investment in green projects is deterred. A lack of a carbon-pricing mechanism or fluctuating subsidies for renewable energy stands as a prime issue in making green investment less attractive

[263] **National Green Tribunal Bar Association v. Ministry of Environment & Forests,** (2011) 5 SCC 397
[264] **Sterlite Industries (India) Ltd. v. Union of India**, (2013) 4 SCC 575
[265] **T.N. Godavarman Thirumulpad v. Union of India,** (1997) 2 SCC 267

compared to traditional financial investments. The case of *"Hanuman Laxman Aroskar v. Union of India"*[266] highlighted how financial decisions based on poor environmental due diligence can face backlash, legal hurdles, and project delays — a major deterrent for impact investors and green funds.

5.3.3: Market barriers in promoting Green Finance

High Upfront Cost: Since this is a significant investment at the beginning which tends to be a deterrent to the investors and because of the long-term returns, Investors tend to back off for such investments.

Limited Market Liquidity: Since the concept of green finance is typically a developing financial investment, the market for green bonds and other financial instruments are growing. Due to lower liquidity, their instruments are less attractive to investors who may prefer more liquid assets. The case of *"Bank of India v. Damani Foods Pvt. Ltd."*[267] underscores how a lack of financial structures or access to green bonds and investment channels hampers the growth of green businesses in India. Banks and financiers are reluctant to fund projects without clear environmental risk management frameworks, thus stalling green finance flows.

Green washing Concerns: Companies tend to exaggerate or falsify their environmental commitments, undermining the confidence of the investor in green finance. High profile cases, where funds labeled as 'sustainable' include investment in major polluters highlight the need for a stringent verification process. An action by the Federal Court of Australia highlights how green bond mislabelling can impact startups in the sustainable finance space—especially those seeking to raise funds through climate-linked financial instruments.[268]

5.4: Lack of Standardized Green Rating Systems and ESG Compliance for Startups

[266] **Hanuman Laxman Aroskar v. Union of India**, (2019) 15 SCC 401
[267] **Bank of India v. Damani Foods Pvt. Ltd.**, (2015) 1 SCC 347
[268] **ASIC v. Vanguard Investments Australia Ltd.**, NSD471/2024, Fed. Ct. Australia (2024).

An increased demand for ethical business practices from societies and a push from governments and international bodies for sustainable development. The ESG criteria is one of the primary frameworks which helps measure corporate responsibility and sustainability. From peripheral concerns to strategic imperatives across industries, ESG frameworks are integrated into the decisions of investment, preference of consumers and formulation of policy. As engines of innovations, startups, although relatively smaller in size and have a constraint over resources, are organizations that can embed ESG values at core.

Due to the absence of standardized and scalable ESG rating systems that are attributed to unique operational and financial realities of startups. Although India has an existing ESG framework it is designed for mature corporations on both, the way the framework deals with analyzing and reporting ESG data comprehensively and the resources and data used for the same.[269] On the other hand, startups and SMEs[270] tend to find these frameworks complex, financially burdensome and misaligned with their developmental stage.

5.4.1: Significance of ESG integration for Startups

Apart from mere compliance, a strategic advantage comes to startups where business models integrate ESG criteria. Strong ESG compliance, results in investor confidence and greater brand loyalty which positions startups as responsible market players.

Investor Confidence: Since the world shifts towards a sustainable financing and impact investing, startups which have a ESG - compliant business model tend to receive funding from investors including venture capitalists and institutional investors who prioritize responsible businesses.

Market Differentiation: ESG compliant startups tend to stand out of the huge number of startups that tend to develop their businesses and such business models tend to act as a market differentiator. Values that align with societal concerns such as carbon-reduction, fair-labor practices and corporate transparency carve out a specifically tailored market and build a better relationship with shareholders, consumers and stakeholders.

[269] Worldfavor, *4 Reasons Why Standardizing ESG Information Is Key for True Impact*, https://blog.worldfavor.com/4-reasons-why-standardizing-esg-information-is-key-for-true-impact
[270] Small and Medium Emterprises.

Operational Efficiency: Efficient resource management, waste reduction and inclusive workplace are sustainable practices which leads to improved productivity and cost-savings. These practices can benefit startups in enhancing financial resilience and scalability.

Regulatory Preparedness: Early adoption of practices, which are aligned to sustainability, helps their operations be future ready. Staying ahead of compliance requirements, reducing legal risks and enhancing the capacity for international expansion are benefits that ESG integration brings to the startups and the other business models.

Rating systems tailored to specific needs for startups are yet not available. ESG standards including the ones issued by the Global Reporting Initiatives (GRI), Task Force on Climate related Financial Disclosures (TCFD) and Sustainability Accounting Standards Board (SASB) primarily deal with large-scale enterprises including the recent BRSR framework released by SEBI.

Since startups tend to lack the organizational bandwidth, financial resources or the technicalities required in order to implement their ESG framework, an absence of standardized ESG framework have led to such inconsistent practices, unreliable self-disclosures and missed opportunities with respect to leveraging ESG for growth and investments.

5.4.2: Challenges and Limitations arising from the absence of a Standardized Green Rating System

Apart from mere compliance, a strategic advantage comes to startups where business models integrate ESG criteria into their businesses. Although frameworks such as the GRI[271], SASB[272] and TCFD[273] play a vital role in institutionalizing ESG disclosure norms, their scope and scale present significant limitations for startups. Since startups would require to have granular disclosures on topics ranging from energy use to labor practices which their disclosures requirements gather in form of data which startups may not be able to track or measure. External audits of ESG compliance might require expensive consulting services and since the materiality

[271] Global Reporting Initiative.
[272] Sustainability Accounting Standards Board.
[273] Task Force on Climate-related Financial Disclosures.

thresholds and sectoral templates are designed for large-scale corporations, it becomes irrelevant for early stage companies with limited operations.

A fragmented and an unregulated framework and an absence of a standardized metric, startups tend to rely on desperate and often self-devised indicators with respect to ESG performance which hampers comparability, confuses stakeholders and diminishes the credibility of ESG complaints. Due to a limited human and financial capital, the implementation of ESG framework can be expensive and time consuming due to lack of internal expertise in developing a reporting threshold. Due to exaggerated and false claims and without validated ESG assessments, startups are vulnerable to accusations of greenwashing and the lack of a harmonized regulatory framework raises legal risks for global investors and accelerators, this creates friction in assessing ESG compatibility of cross-border startup portfolios.

5.5: Empirical Analysis of Green Finance Adoption in Indian Startups

5.5.1: Introduction

The dynamic interrelation between environmental goals and financial innovations have led to several changes in both environmental and financial practices. One such innovation is green finance which plays a pivotal role in the paradigm shift across both policy disclosures and investment strategies. While the global frameworks on green finance have led to several national and international policies which have had a drastic impact as to how green finance is perceived across the industry, the practical adoption of green finance models into early stage-startups primarily startups remain uneven.

Although startups are in their early-stage which make them have an easier mechanism for both pivot and practical innovation and thereby align their financial goals with the bigger climate goals. However, due to the multi-leveled and multi-faceted challenges, these startups are not able to access and utilize green finance in an effective manner.

To bridge the gap between policy intent and practical application, this subchapter 5.5, outlines perceptions, experiences, and expectations the findings of an empirical analysis conducted through semi-structured interviews of their perceptions, experiences, and expectations of 25 individuals

divided into various segments as stakeholders who play a vital role in promoting green finance in the Indian startup ecosystem. The study further focuses on understanding green finance from both demand and supply perspective.

5.5.2: Research Design

With a qualitative exploratory approach focused at understanding the complex landscape of green finance adoption amongst Indian startups, this qualitative study allows an in-depth examination of stakeholder perceptions, institutional limitations and policy dynamics beyond the quantitative metrics, given the novelty of green finance and paucity of standardized frameworks with respect to green finance in India.

5.5.3: Objectives of the Empirical Study

The following are the objectives of the empirical study:

- To determine the level of awareness, accessibility and utilization of green finance among the Indian startup ecosystem.
- To identify the challenges faced by startups while accessing or distributing green finance mechanisms.
- To understand the role of regulatory framework whether as a facilitator or a barrier to the penetration of green finance in the investment mechanisms.
- To develop a multi-perspective narrative that aligns startup needs, investor concerns, and institutional realities.

5.5.4: Sampling and Participant Profile

Types of Stakeholders	Number of Representatives
Startup Founders / CXOs[274]	10

[274] See, Annexure II

Financial Investors[275]	05
Financial Institutions[276]	05
Policy Experts[277]	05

Table 5.1 deals with various types of stakeholders and the corresponding number of representatives interviewed from each group.

5.5.5: Data Collection

With the help of semi-structured interviews[278] conducted primarily over virtual platforms over a period of 20-30 minutes each in English. Although there were interviews structured and tailored specifically to types of stakeholders, the analysis broadly discusses on:

- Awareness levels and understanding of Green Finance
- Experience/Interest in accessing or offering Green FInance
- Challenges in accessing or distributing Green Finance
- Suggestions for a better Green Finance Framework
- Comparative References of Global policies on Green Finance and the current Indian Framework.

5.5.6: Data Analysis

A thematic analysis has been adopted across the study to interpret the data. The responses that were received were coded using an inductive approach to identify the recurring patterns, contradictions and unique insights and were further analyzed under four response matrices each corresponding to a stakeholder group and under categories which includes awareness, access, challenges, impact perception, and policy suggestions. This analysis helped to highlight the points

[275] See, Annexure III
[276] See, Annexure IV
[277] See, Annexure V
[278] Questions for the Semi Structured Interviews can be accessed at Annexure I

of convergence and divergence among stakeholders and offers a holistic understanding of the green finance adoption in the Indian startup ecosystem.

5.5.7: Findings and Interpretations: Synthesis of Interview Insights

With over 25 stakeholders ranging across startups, investors, financial institutions and policy experts[279] bring out a detailed understanding and a multi-faceted approach with a multi-layered perspective on the evolving landscape of green finance in India and its startup ecosystem. The key themes, patterns and discrepancies observed from the empirical investigation can be summarized as follows:

1. Awareness and Understanding of Green Finance

A few of the startup founders/CXOs have an in-depth awareness of green finance and have already accepted green financial instruments (primarily startups in clean-tech or ESG oriented ventures), a lot of the founders have a very limited to moderate knowledge with respect to green finance. This knowledge gap is a result of an absence of a centralized repository of green finance options and a non-regulated revenue-based eligibility criterion.[280]

This highlights a critical disconnect between the availability of green finance and awareness of the startup ecosystem which can be filled through targeted campaigns, ESG-education platforms and the integration of the ecosystem including incubators and accelerators for faster growth in the startup ecosystem.

2. Accessibility and Procedural Hurdles

Procedural complexities, documentation burdens and revenue-based eligibility were key barriers even for startup founders who are well-versed with green finance. Financial institutions[281] revealed a cautious approach in implementing and verifying impact claims primarily due to an absence of a standardized environmental benchmark.

[279] See Chapter 5.5.4
[280] See, Annexure II
[281] See, Annexure IV

This underscores the urgent need for a simplified, startup specific green finance product with transparent eligibility criteria and norms and a quicker turnaround time. Moreover, a collaboration between Fintech platforms and Banks can automate green finance processes including ESG assessments for faster evaluations.

3. Investor Hesitation and the Greenwashing Challenge

Although certain investors agreed on the value of integrating ESG in startups, a lot of these startups were skeptical with respect to funding these startups. Primarily due to the challenges in verification and fears of greenwashing, investors lacked the belief in investing in startups. In addition to that, a lack of clear, quantifiable metrics on the basis of impact leads to a cautious capital allocation.

The investors were of the view that there is a need for standardized ESG metrics supported by third-party verification mechanisms and blockchain-backed ESG reporting to ensure transparency. Some of the investors were of the view that early-stage ESG disclosures and ESG readiness scores could be made a part of the pitch deck for funding.

4. Sectoral Focus and Emerging Trends

Investors and financial institutions appear more inclined to fund sectors with tangible and measurable impact on the environment. Startups which focus on renewable energy, mobility, agri-tech, water conservation and circular economy initiatives. Since these startups have a demonstrable outcome, investors were more inclined to invest in these companies.[282]

The policy experts highlighted that governmental initiatives like Sovereign Green Bonds and sectoral missions are highly aligned to achieve an environmentally friendly initiative. The experts suggested that a harmonization between investor focus and public policy could accelerate the shifts of green finance from a modern method of financing to a mainstream model/orthodox method of funding.[283]

5. Role of Regulation and Policy

[282] See, Annexure III & IV
[283] See, Annexure V

Regulatory and Policy experts were of the view that to bridge the green finance gap, the current framework although disintegrated in nature would be beneficial. Guidelines such as the RBI's ESG disclosures, MoEF's Green Credit Scheme and Startup India's new ESG linked program are beneficial to the current green finance landscape. However, most of the interviewees were of the view that a lack of a unified national taxonomy on green finance, fragmented regulations and slow to no execution stands as a barrier in promoting green finance as a mechanism for startups.

They stated that an implementation of the global best practices such as EU, China, Korea and Germany where structured taxonomy, ESG rating systems and Public-Private partnerships, co-investment frameworks can improve trust, transparency and accessibility in the green finance space.

6. Future Directions and Policy Recommendations

A common aspiration throughout the interview was the blending of financial innovation with sustainability including:

- A Blended financial instrument which reduces the risk for private players.
- Early Stage ESG scoring and readiness assessments
- Decentralized Carbon trading and incentives for verified emissions reductions.
- Customized ESG incubators and accelerators for handholding early - stage startups.

5.6: Conclusion

Chapter V underlines the multifaceted challenge and systemic gap which acts as a barrier in the current Indian startup ecosystem. Although a huge number of startups focus on sustainable investment, the absence of a codified regulation creates significant uncertainty. Furthermore, the chapter reveals critical institutional and regulatory barriers ranging from limited expertise and coordination between financial and environmental policies. These factors bring a high perceived risk and limited market liquidity issues which act as a barrier at adoption of green finance as a mainstream model despite the growing environmental needs. In addition to this, the lack of a standardized ESG compliance metric for startups worsens the situation. The chapter consists of an empirical study of 25 individuals through a qualitative analysis and brings out the hurdles that

stakeholders at both ends of Green Finance face primarily due to procedural and accessibility issues.

In conclusion, this chapter underscores that bridging the gap between policy intent and practical application is one of the major challenges of transforming India's green finance landscape. A coordinated effort to develop a codified legal framework, streamline institutional processes and a tailored ESG guidelines is essential. This not only results in inconsistent disclosures but also leaves these startups vulnerable to greenwashing and other such measures. Such measures would create an enabling environment which enhances the confidence of the investor and also empower startups to innovate and scale sustainable solutions.

CHAPTER 6

FINDINGS OF THE STUDY AND RECOMMENDATIONS

"We are the first generation to feel the impact of climate change and the last generation that can do something about it."[284]

6.1: Findings & Conclusion

6.1.1: Summary of Key Findings

The study sets out to examine the regulatory landscape governing green finance in India with a primary focus on the perceived and actual impact on the startup ecosystem. With a multi-disciplinary approach, culminating insights from the law, finance and environmental frameworks and entrepreneurial ventures. This multidisciplinary approach was implemented in order to build a coherent narrative beginning with theoretical foundations and extending to an empirical inquiry for a holistic study on green finance in the Indian startup ecosystem.

Chapter 1 introduces the reader to the increased need of green finance as a strategic response to climate change, ecological degradation and a shift towards inclusive development. A special focus was on the green finance mechanisms such as green bonds, ESG funds and sustainability linked loans. Focused on innovation and being agile in nature, startups emerge as a fertile ground for the examination of the intersection of finance and sustainability. Research objectives were defined and a gap with respect to the existing literature was identified on the "lack of legislative analysis"of green finance with a special focus on the startup ecosystem. Methodologically the study employed both doctrinal and empirical methods. Through the doctrinal study and use of secondary data, the study illustrates the trends and effects of green finance and through the empirical study[285], the focus was on whether the implementation was smooth or not and thereby understands the implication of the current regulations on the Indian startup ecosystem.

Chapter 2 provides the conceptual scaffolding for the research. This chapter primarily focuses on the definition, instruments and theoretical foundations underpinning green finance. Through

[284] **Christiana Figueres**, Costa Rican diplomat
[285] See Chapter 5

exploration of theories such as stakeholder theory, environmental economics and sustainable development, the chapter laid down the foundation on how green finance would influence the Indian startup ecosystem. In addition to this, the paper also focuses on the concept of green entrepreneurship and the need of business models to align with sustainability goals. Moreover, the study prioritizes the relevance of ESG compliance and growing influence on the decision of the investor.

Chapter 3 delves into the Indian regulatory context of landscape with a fragmented green finance landscape in India, regulatory agencies in India such as SEBI, RBI and the MoEFCC having varied regulations and frameworks such as the green bond disclosure by SEBI, priority sector lending by RBI, the absence of a codified and comprehensive green finance legislation remain a major hurdle. This chapter primarily focuses on the regulatory framework which hinders the integration of the green finance framework.

Chapter 4 introduces a comparative and international approach. India's commitment under the global frameworks such as Paris Agreement and the SDGs were examined revealing that although India has shown intent, domestic regulations stand as a barrier. Through juxtapositioning the Indian regulatory and financial framework of the European Union and China, this study observed the convergence (Emphasis on Green Finance) and divergence (ESG reporting for Startups).

Chapter 5 addressed the gaps, challenges and the barriers within India's green finance landscape. With issues ranging from the absence of a uniform ESG rating system, limited awareness among entrepreneurs regarding green financial instruments to the lack of incentives tailored for startups, the current green finance framework of India is in need of a dynamic shift both in the areas of policy framework and the implementation of the mechanisms. The study also focused on the critical role of the banking sector which although has made notable changes still are conservative in funding startups due to a higher perceived risk. The final analytical part of the study focused on the empirical observations which revealed that while some of the startups have received benefits of green finance and such incentives, these instances are sporadic and incidental which are primarily driven by scattered investments from international investors, impact investors and private initiatives rather than institutional support. These points reinforced the view that while the

narrative around green finance is gaining traction, its operationalization within India's startup ecosystem is nascent and inconsistent.

6.1.2: Contribution of the Research

This research curated several contributions across academic and policy discourse. Through an in-depth analysis on the impact green finance framework has on the startup ecosystem, the study contributes to the legal practice.

From an academic perspective, this study offers one of the few legal-centric explorations of green finance in India. Most of the existing literature, primarily focuses on the economic or environmental implications of sustainable finance overlooking the regulatory mechanism and the legislative gap that undermines it. The research through bridging this gap enriches the interdisciplinary approach to law, finance and sustainability.

From a policy driven standpoint, this study brings to the roof, critical disconnections between the global best practices, domestic policy structures. While India actively participates in international dialogues on sustainability, the internal policies, especially on startups lack the clarity, enforceability and targeted support necessary for green finance to be one of the mainstream financing models.

From a legal practice perspective, the research provides a roadmap for future legislative development through a comparative study of the models of EU and China and calls for attention to the need for codification, consistent regulatory mandates and centralized rating systems. The research also focuses on the entrepreneurial landscape, making it relevant to incubators, venture capitalists and startups themselves. Through highlighting the barriers in accessing green finance, the study offers recommendations for ecosystem actors looking to align their operations with ESG goals.

6.1.3: Final thoughts on India’s Trajectory in Green Finance

At a critical juncture, India stands at the beacon of sustainable development. As one of the fastest-growing economies and a signatory to numerous international environmental treaties, India

occupies a responsibility and an opportunity to lead by example in the integration of sustainability into financial and business systems.

However, the findings of the study indicate that India's green finance regime is still in its formative stage. While there is a growing awareness of green principles among regulators and entrepreneurs, the actual translation of these principles into enforceable, scalable and startup friendly legal frameworks is limited. The lack of codified legislation coupled with fragmented institutional mandates and voluntary ESG compliance mechanisms proves that green finance remains more of an initiative rather than a financial strategy.

With continuous insufficient regulatory clarity, financial incentives and institutional support, startups often face significant barriers to accessing green financial products or developing them. Since startups cannot dedicate a department to ESG compliance due to operational and resource constraints, startups require a more supportive ecosystem both financial and regulatory to make sustainability an integral part of their business model.

While international commitments and policy dialogues provide frameworks, they must be backed through legally binding domestic regulations in order to ensure consistency, transparency and accountability.

6.1.4: Concluding Remarks

The research hypothesized that the legal and regulatory frameworks governing green finance in India play a significant role in promoting a sustainable startup ecosystem through financial incentives, regulatory clarity and policy support. However, neither the analytical study nor the empirical evidence[286] gathered through the study supports the hypothesis.

Instead, the findings reinforce the null hypothesis[287], that the observed impact of green finance is largely incidental in nature and not as a result of a structured comprehensive legal framework. Although there are regulatory efforts which are commendable, they are not yet strong or consistent enough to shape systemic changes. As such, India’s startups which do not engage in green

[286] See, Chapter 5
[287] See, Chapter 1.5

innovation tend to do so despite the regulatory environment rather than because of it. This however does not suggest a bleak outlook, rather a significant opportunity to reform, the study states several recommendations[288] which will shape the sustainable ecosystem of the country.

In conclusion, although the current green finance landscape both through the less of policy and finance are not yet mature enough to shape the startup landscape, it holds strong promises. With the help of coherent legal backing, regulatory foresight and institutional commitment, India can unlock the potential of green finance. The future of green finance and green startup not only lie with market forces or international obligation but also on how the legal system reacts to the challenges of sustainable development.

6.2: Recommendations & Suggestions

The following recommendations are structured into two key categories: **General and Specific.** Both of these categories have different layers of the green finance ecosystem with a special focus on the Indian startup ecosystem. The **general recommendations**[289] with a special focus on policy initiatives, structural reforms and ecosystem-level strategies primarily target on improving the current green finance landscape in the country from establishing dedicated missions to enhancing transparency with the help of digital monitoring. These recommendations focus on creating a robust and a dedicated system of green finance in the country through reforms across institutions, policy and business models. The **specific recommendations**[290] on the other hand, focuses on the strategies emerging from empirical and practical insights. Focusing on regional disparities, greenwashing and a tailored financial product for startups, these recommendations focus on creating an actionable framework to fill the gaps in the implementation of green finance.

6.2.1: General Recommendations

1. Establishment of a National Green Startup Mission

Since the green finance framework of India lacks a specific focus on startups and early age ventures, an establishment of a National Green Startup Mission is of prime importance. Through

[288] See Chapter 6.2
[289] See Chapter 6.2.1
[290] See Chapter 6.2.2

a dedicated mission under the aegis of MoEFCC[291] or NITI Aayog, it brings a multi-dimensional focus including incubation centres, mentoring and networks, providing tax benefits to lower the financial burden on innovative but high risk ventures and include funds which would help in bridging the funding gaps primarily during its early stage of operations.

Through fast-track regulatory clearance and a simplified compliance product for green startups, this study focuses on reducing bureaucratic delay while shifting the focus to innovations rather than compliance. A centralized initiative is beneficial as it significantly tracks progress, integrates research and technological advancement into finalizing decisions and serves as a channel for collaborations between government initiatives, Green finance investors and investors who are committed to a sustainable future, both environmentally and economically.

2. Integrate ESG Metrics into Early-Stage Startup Valuation

Earlier, Investment in startups were primarily focused on market potential, growth forecasts and profitability and the valuations did not consider environmental factors into play. Integration of ESG metrics into the process of evaluation can shift the motivations of investment in startups/ This involves an entirely new framework for valuation which assess energy consumption, waste management, community impact and governance structures alongside the traditional financial indicators.

Through such activities startups working in the green projects will gain recognition for their broader societal contributions. A call for collaboration is necessary in order to devise standardized ESG criteria with individuals for every type of stakeholders. It also encourages regulatory bodies to acknowledge these parameters formally, through amendment in financial reporting and disclosure requirements. Apart from fostering attraction of impact investors, long-term value creation through aligning business goals with environmental policies should be one of the driving forces behind integrating ESG criteria in startup's or early-stage venture's business models.

3. Promote Financial Literacy on Green Instruments

[291] Ministry of Environment, Forest and Climate Change

A lot of startup founders in India are unaware of green finance and the instruments concerned with it such as green bonds, sustainability linked loans or carbon-credit systems. To mainstream the concept of sustainable businesses, the knowledge gap needs to be prioritized at the top-most level.

Through capacity-building programs, tailored seminars and dedicated models within entrepreneurship development programs can in-person demystify these instruments. In addition to these, digital programs including courses and webinars which focus on complex financial concepts would help founders, investors and individuals understand these concepts and be better equipped to design, manage and benefit from green finance products. This increased financial literacy would help drive entrepreneurial innovation which ensures that startups not only access necessary funding but also optimizes the usage of such funds to achieve the desired environmental outcomes.

4. Incentivize Financial Institutions to Back Green Startups

Through a public-private partnership or even through independent investments of a part of their venture capital funds (if they are an investment firm or a VC[292] firm) or through their 'CSR[293]' campaigns (if they are companies which operate in an absolutely different course of business) to green finance is paramount.

This recommendation calls for policy measures which mandates or provide incentives for banks and financial institutions to extend credit lines, lower the interest rates or even offer partial risk guarantees for financing green innovations. With a prime objective to create an environment where the risk of innovation is balanced with government backed credit enhancement tools. Through directing financial resources to a more sustainable project, this approach aims at bridging the funding gaps and support early-stage ventures and act as a catalyst in the cycle of innovation, investment and the environmental impact.

5. Harmonize and Streamline Regulatory Frameworks for Green Finance

One of the critical recommendations for strengthening the green finance landscape in India is to harmonize and streamline the regulatory landscape and create a cohesive framework which supports startups, investors and other associated stakeholders. Since the current regulatory

[292] Venture Capital.
[293] Corporate Social Responsibility

landscape in India is scattered and spread across jurisdiction[294] and areas which sometimes lead to overlapping mandates and regulatory uncertainty which hinders the flow of capital, stifles innovation and limits the agility of startups in adapting to environmental challenges and market dynamics.

Through consolidating existing regulations by clear and harmonized standards for green finance instruments, including green bonds, sustainability linked loans and impact investments with respect to equity investments. This framework would involve a standardized framework of ESG reporting format, verification mechanisms and compliance procedures.

6.2.2: Specific Recommendations

1. Tailor-Made Financial Products Are Urgently Needed

Due to the misalignment of the current financial mechanisms with the cash flow pattern and business cycle of startups, green projects faced barriers with respect to investments. To address this issue and to promote green finance, these financial products need to be innovated and tailored for the dynamic green projects. Models like revenue-based financing or milestone-based disbursement with flexible repayment schedules which correlate with the achievement of environmental performance markers.

This approach would enable startups to secure funding and reduce the risk of financial constraints. Further collaboration with fintech companies to leverage data analysis, ensuring that each startup's funding needs are precisely matched with their project milestone and environmental outputs. These products would not only facilitate smoother cashflow but also incentivize startups to meet progressive environmental targets. This targeted approach, backed by empirical evidence could result in higher success rates, greater investor confidence and ultimately foster a more resilient green finance ecosystem in India.

2. Build a Real-Time Green Finance Monitoring Portal

Two of the essential factors in the deployment of green finance are transparency and accountability which plays a vital role in building trust amongst stakeholders. A centralized digital dashboard or

[294] See, Chapter 3

a monitoring portal can track the flow, utilization and performance of green finance initiatives. The model of such a portal would include aggregating data from government schemes, private funding and investor commitments, it would specifically display disbursement records, track usage in terms of pre-defined environmental impact, KPIs[295] and provide up-to-date analytics on funding efficacy.

Through real-time audits and comparison amongst peers, this portal can allow policy-makers and investors to make a data-driven decision. Apart from acting as a tool for investors, it also plays a huge role in differentiating a product and making the public aware about the progress of green finance interventions and their real-world impact. This transparency would be expected to mitigate risks such as fund misappropriation or greenwashing thereby strengthening the confidence in the system.

3. Include Green Certification as a Prerequisite for Funding

Greenwashing is a primary challenge in the field of green financing thus diluting the confidence of the investor and potentially misdirecting resources. A specific mechanism to develop a national-level green certification mechanism that would ensure that only ventures with verifiable environmental benefits access green funding. Through a rigorous process combining independent audits, on-site inspection and performance evaluations to score startups on the basis of their impact on the environment.

This certification mechanism would not only establish higher accountability standards but also create a competitive advantage for eco-friendly startups. Ethics certification would help investors and institutions to have a robust, standardized framework to assess grant or loan applications, ensuring alignment with environmental objectives and regulatory compliances. Through institutionalizing these certificates, the green startup ecosystem can attract more serious investors and establish itself as a credible source of sustainable innovation.

4. Leveraging Blockchain and Smart Contracts for Transparent Green Finance Disbursal and Monitoring

[295] Key Performance Indicators.

Trust, traceability and accountability are three critical factors which determine that a fund will be involved or used for the intended environmental purposes. One of the vital challenges that was revealed is the lack of transparency in the allocation of funds and monitoring of milestones. Blockchain technology and smart contracts are new age technologies that can help mitigate these issues. A blockchain based registry can record and verify all the green financial transactions while smart contracts - self executing digital agreement can automatically release funds to startups once the pre-defined criteria are met (e.g.: reduction in carbon emissions, sustainable procurement practices)

The implementation of blockchain and smart contracts would lead to the elimination of the need for intermediaries and minimize administrative overheads, delays and misuse of the funds. This system would allow real-time auditing and enable regulators and investors to verify environmental impact through sustainable records. Startups especially in clean-tech, agri-tech or waste management could upload sensor based or third party validated performance data directly into blockchain triggering smart contracts-based payout.

5.AI-Powered Green Credit Scoring and Due Diligence for Startups

Access to green finance remains limited for early-stage startups due to inadequate credit profiling and the absence of a structured environmental due-diligence framework. One of the key insights from the empirical study was that there is a lack of a reliable system to access "green credibility[296]" and risk profiling of emerging ventures, especially in tier I and tier II cities. An introduction of an AI-powered green credit scoring system would be beneficial in analyzing both financial health and sustainability metrics of startups using machine-learning algorithms. Through inputs including emission reduction targets, supply chain circularity, ESG disclosures and prior -compliance records.

Through scanning and validating satellite imaging, IoT[297] sensor data and such reports and reducing reliance on self-declarations or costly manual audits. AI-tools can assist in predicting long-term impact and financial viability thereby helping investors and banks make informed

[296] Gino Verleye et al., *Credibility of Green Advertising: Six Elements That Drive Credibility in Green Advertising*, 8 Front. Commun. 1056020 (2023), https://www.frontiersin.org/journals/communication/articles/10.3389/fcomm.2023.1056020/full.
[297] Internet of Things

decisions. These systems can democratize access to green finance for startups and ensure that funding decisions are rooted in real world environmental data rather than pitch deck or projections alone. It is a leap towards objective, data-driven sustainable investment in India.

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ANNEXURE - I

STRUCTURED QUESTIONNAIRE FOR EMPIRICAL STUDY

Consent Statement:

"This questionnaire is designed for academic research purposes to explore stakeholder perspectives on green finance in the Indian startup ecosystem. The data collected will be used solely for research and publication, and all responses will be kept confidential and anonymized. Your participation is voluntary, and you may withdraw at any point."[301]

Section A: Startup Founders/CXOs

- How familiar are you with the concept of green finance?
- Have you considered or availed green finance for your startup? Why or why not?
- What are the key challenges in accessing green finance for startups?
- How do you perceive the impact of green finance on business sustainability?
- What incentives or support would encourage more startups to adopt green finance?

Section B: Investors

- How do you assess the viability of a startup for green finance investment?
- What challenges do investors face in funding green startups?
- What criteria do you use to evaluate the impact of green finance on business models?
- Are there specific sectors in startups where green finance is more prevalent?
- What policy or market changes could improve green finance accessibility?

Section C: Financial Institutions

- What green finance products or services does your institution offer for startups?
- How do you evaluate the risk and return profile of startups seeking green finance?
- What are the common reasons for approving or rejecting green finance applications?
- How has the demand for green finance evolved in the Indian startup ecosystem?

[301] The consent statement was informed to the interviewee prior to the commencement of the interview, ensuring their voluntary participation and understanding of the research purpose.

- What regulatory challenges exist in offering green finance products to startups?

Section D: Regulatory and Policy Experts

- What policies exist to support green finance adoption among startups in India?
- What role do regulatory bodies play in ensuring green finance accessibility?
- How can government incentives improve green finance adoption?
- Are there international models that India can adopt for better green finance penetration?
- What future trends do you foresee in green finance for Indian startups?

ANNEXURE - II

DATA SHEET – RESPONSES FROM STARTUP FOUNDERS / CXOs (N = 10)

Sl No.	Familiarity with Green Finance	Considered/Availed Green Finance? Why/Why Not?	Key Challenges	Perceived Impact on Business Sustainability	Support/Incentives Needed
1	Moderate awareness, general understanding	No – Not aware of accessible schemes	Information gap, complex process	Potential to build brand, long-term savings	Awareness drives, simple eligibility
2	High – actively researches ESG trends	Yes – Availed small grant via SIDBI	Application delays, low funding	Helps build investor trust and credibility	Faster disbursement, govt guarantees
3	Low – just heard the term	No – Never explored	Don't know where to apply, unclear ROI	Unsure – seems positive	Workshops, tailored startup policies
4	Good – through investor networks	No – Rejected due to lack of collaterals	Collateral requirement, unclear criteria	Can boost efficiency and reduce energy costs	Relaxed collateral rules, sector-specific incentives
5	Moderate	No – Focused on scaling first	Time-consuming documentation	Valuable for long-term planning	Green finance advisors or startup cells
6	High – studied while building ESG model	Yes – Took a green loan	Approval process was long	Essential for climate-tech credibility	Streamlined loan process, training support
7	Limited – aware via accelerator	No – Not eligible	Lack of tailored solutions for	Encourages responsible innovation	Pre-seed green fund schemes

	programs		early-stage startups		
8	Moderate	No – Advisors didn't recommend	Not a priority for VCs, long timeline	Could open global funding channels	Integrate with mainstream VC models
9	Low	No – Focus on core business, not aware of it	No outreach from institutions	Could help with scaling and compliance	Outreach and education at incubators
10	High – ESG central to business model	Yes – Participated in state green fund	Initial struggle to find the right channel	Key differentiator in competitive space	Central green startup database and credit scoring

ANNEXURE - III

DATA SHEET – RESPONSES FROM INVESTORS (N = 5)

Sl No.	Viability Assessment	Challenges Faced	Evaluation Criteria for Green Impact	Prevalent Sectors	Suggested Policy/Market Changes
1	Based on ESG framework alignment and innovation potential	Lack of standardized metrics and reporting	Environmental KPIs, alignment with SDGs	Clean energy, sustainable packaging	ESG-based tax incentives, startup scorecards
2	Market potential + compliance with global green norms	Risk of greenwashing	Carbon savings, water use, lifecycle analysis	Agritech, EV, cleantech SaaS	Mandatory green audits, subsidy-linked funds
3	Track record of founders + climate mission	Poor clarity on policy implementation	Impact reports, stakeholder engagement	Renewable infra, biodegradable goods	Clarity in green definitions, uniform disclosure rules
4	Patent/IP and regulatory approvals	Regulatory risk, low exit predictability	Carbon offset value, net-zero pathways	EV battery tech, biofuels	Green venture capital schemes, blended finance
5	Customer traction in green markets	Misalignment between green goals and profitability	Circularity metrics, social co-benefits	Sustainable textiles, green logistics	Risk insurance for green funds, PPP models

ANNEXURE - IV

DATA SHEET – RESPONSES FROM FINANCIAL INSTITUTIONS (N = 5)

Sl No.	Green Finance Products Offered	Risk-Return Evaluation	Approval /Rejection Factors	Demand Evolution	Regulatory Challenges
1	Green SME loans, ESG-linked loans	Market readiness + financial history	Approved: high-tech solutions; Rejected: no track record	2x growth in climate startup inquiries since 2021	Absence of a unified green taxonomy
2	Green venture debt, solar financing	Weighted ESG risk score + revenue forecast	Approved: clear ESG use-case; Rejected: lack of sustainability proof	Gradual but steady rise, mostly urban-centric	Inconsistent reporting standards
3	Carbon credit pre-financing, green overdrafts	Impact adjusted return models	Lack of regulatory clarity leads to hesitations	Significant jump post-G20 India Summit	No incentives to underwrite green startups
4	Green bonds, interest subsidies for eco-products	Climate-risk inclusion in credit scoring	Rejection due to unverifiable impact claims	Youth-led startups driving demand	Absence of green finance sandbox for innovation
5	Energy-efficiency loans, climate innovation grants	Piloting ESG indexing	Delayed disbursement due to poor documentation	Demand surging in Tier 2 cities	Need for AI-based impact scoring clarity

ANNEXURE - V

DATA SHEET – RESPONSES FROM POLICY EXPERT (N = 5)

Sl No.	Existing Policies	Regulatory Role	Govt. Incentives Proposed	International Models to Adopt	Future Trends Predicted
1	FAME II, Renewable Energy Development Fund	Define ESG criteria, monitor fund allocation	Green startup incubation subsidies	EU Green Taxonomy	Digital ESG reporting systems
2	SIDBI Green Finance, PLI Scheme	Certification of green businesses	Climate-linked incentives, low-interest loans	Singapore Green Finance Centre	Integration with UPI/fintech for green credit
3	SEBI BRSR, National Hydrogen Mission	Mandating ESG disclosures for startups	Capital gains waiver on green investment exits	UK Green Investment Bank	Rise in green blockchain financing
4	Startup India Green Track	Framework creation, inter-agency collaboration	Weighted funding scores for green impact	China's Green Credit System	ESG audit regulation for private startups
5	National Adaptation Fund	Acts as policy think-tank and evaluator	International funding leverage tools	Germany's KfW support system	Climate risk-insurance integration in financing